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ABSTRACT

This guidebook was developed to assist citizens in initiating programs to prevent tooth decay in young children through the use of fluoridation. It contains outlines for determining the needs of the school and community for fluoride in drinking water, and presents the various steps and activities that are necessary for developing and implementing a self-applied fluoride program in the school and the home. It provides sample letters for requesting parental consent, listings of supplies and personnel required, and instructions for conducting procedures in the classroom setting. A paper on the use of dietary fluoride supplements is included in the guidebook. Also included is a reprint of an article on the prevention of dental caries by mouthrinsing with solutions of neutral sodium fluoride. (JD)

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PREVENTING TOOTH DECAY:
a guide to implementing self-applied fluoride programs in schools

ED044928

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service — National Institutes of Health

ED144928

PREVENTING TOOTH DECAY:

A Guide for Implementing Self-Applied Fluoride in Schools

national caries program

national institute of dental research

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
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In recent years, individuals have become increasingly interested in health activities within their respective communities and states. Knowledgeable persons CAN initiate programs to prevent disease, including ones to prevent tooth decay. This publication has been designed to help YOU improve the oral health of the children in your community.

This guide was developed to present the various steps and activities that are necessary for developing and implementing a self-applied fluoride (SAF) program in a school district or community in order to prevent dental decay. The guide uses the best available information based upon research findings and the experience of many people engaged in carrying out SAF programs. Because each community is unique, no one approach is suitable for every location. Therefore, these guidelines must be somewhat general. Moreover, the planning and implementation of SAF programs in schools must be responsive to local needs. Thus, it is important that, as a catalyst or activator, YOU become knowledgeable about the preventive dental needs of your community and about self-applied fluoride procedures.

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INTRODUCTION

Dental caries (tooth decay) ranks among the most prevalent diseases in our society. Tooth decay starts soon after primary teeth erupt in early childhood and can continue throughout adulthood. Few individuals escape the disease which is the leading cause of tooth loss before age 35. Only a few years ago, most people believed that tooth decay was inevitable and had to be endured. Today, we know that tooth decay need not occur if certain preventive measures are taken. Although our understanding is incomplete, it is known that dental caries is a complex process involving at least three factors: (1) a susceptible tooth, (2) certain bacteria and (3) certain foods (particularly sugars) in the diet. The disease does not occur if any one of these factors is missing. Efforts to prevent tooth decay have been directed toward eliminating one or more of the three factors by making the tooth less susceptible; by controlling or inhibiting bacterial growth (dental plaque); or by altering harmful ingredients in the diet or modifying eating habits.

Making teeth less susceptible to dental decay includes the use of fluorides both that are ingested (systemically applied) and placed directly onto teeth (topically applied) and the application of plastic sealants to the pits and fissures of teeth.

Methods to inhibit or control growth of oral bacteria include the mechanical removal of dental plaque with a toothbrush and dental floss by the individual at regular intervals. Chemical agents to control the growth of oral bacteria are being assessed as an adjunct or possible alternative to oral hygiene procedures, but as yet none is available for public use in this country.

Until acceptable alternative sweeteners that do not contribute to dental decay are developed, reducing the frequency of eating sweets is strongly encouraged.

TODAY, FLUORIDE IS THE MOST EFFECTIVE WEAPON TO COMBAT TOOTH DECAY. THE EXACT WAY IN WHICH FLUORIDE WORKS IS NOT COMPLETELY UNDERSTOOD. WE DO KNOW, AFTER YEARS OF RESEARCH, THAT BOTH SYSTEMICALLY AND TOPICALLY APPLIED FLUORIDES MAKE TEETH LESS SUSCEPTIBLE TO DECAY.

Community Water Fluoridation

Fluoride occurs naturally in nearly all water and foods—it is an essential nutrient for proper growth and development. Fluoridation is the adjustment of the fluoride content of a community's water supply to an optimal* concentration for the prevention of tooth decay. Water fluoridation is the foundation upon which any local, state or national program for the prevention of dental caries should be based. Fluoridation is inexpensive and the entire community benefits regardless of economic or educational level, individual motivation or the availability of dental manpower. No direct action is required of the individual. Tooth decay is reduced by 50-65 percent among children who consume optimally fluoridated water from birth. The major shortcoming of community fluoridation is that its application is limited to areas served by central water supplies. Nearly 50 million persons in the United States cannot benefit from the procedure because they live in areas that lack central water systems.

School Water Fluoridation

An effective method of providing the benefits of systemic fluoride in geographic areas that lack central water supplies is the fluoridation of school water supplies. Rural schools frequently have an independent water supply that can be fluoridated. Several states have implemented school fluoridation programs. Both North Carolina and Kentucky have more than 100 schools that are fluoridating their water supplies. School fluoridation is effective in reducing tooth decay by about 40 percent. A disadvantage of school fluoridation is that its use is limited to school hours only and to areas in which both the school water and the home water supplies of all students have low levels of naturally occurring fluoride.

Professional Applications of Topical Fluorides

Fluoride can also be applied topically to teeth by a dentist or a dental hygienist. This method requires thorough cleaning of the teeth before the fluoride is applied. Fluoride solutions or gels are then either painted on the teeth or they are applied with the use of mouth trays. To be effective for caries-prone children, the procedure should be done at last semi-annually. Although professionally applied fluorides will reduce tooth decay by 30-40 percent, it is an expensive method both from the standpoint of dental manpower and money compared with other approaches.

* 0.7 to 1.2 ppm (parts per million)

Self-Applied Fluorides

The use of self-applied fluorides (SAF) is not new. Toothpastes with fluoride have long been commercially available to help reduce tooth decay, and their use is recommended for everyone. Regular use by children of a fluoride toothpaste can reduce their tooth decay by 15-30 percent. Moreover, for many years, dentists and physicians have prescribed drops and tablets of supplemental fluoride for children residing in areas in which inadequate levels of fluoride exist in the water supply. Unfortunately, to provide maximum protection, fluoride supplements must be taken daily from birth until age 13 or 14. Although some parents and their children successfully practice this procedure, it has been found by most families to be too difficult to remember and frequently the dietary fluoride supplements are discontinued too early to provide sustained protection.

Another procedure prescribed by some dentists is the home use of fluoride mouthrinses to provide protection from dental decay. The mouthrinse method must be applied on a long-term basis in order to provide lasting protection.

Self-Applied Fluoride Programs in Schools

For the past two decades, considerable research has been conducted on the use of fluoride tablets or fluoride mouthrinses in schools. Because children attend school regularly and therefore are readily available and because schools operate on a more rigid schedule than do individual families, schools are a logical place for administering self-applied fluoride to children. Results of studies show that tooth decay can be reduced by 20 to 50 percent by once a week fluoride mouthrinsing and 20 to 35 percent by the daily use of a fluoride tablet in school. These results are based on the use of the respective agent only during the school year.

Today, more than four million children in this country are using a fluoride mouthrinse once a week or a fluoride tablet once a day in schools. Some school programs utilize both procedures, if conditions are appropriate. Self-applied fluoride programs in schools have the following advantages:

1. The procedures have been proved effective in reducing tooth decay.
2. They involve little time.
3. The technics of rinsing or using tablets are easy to learn.
4. Few materials and supplies are required; thus, these programs are inexpensive.
5. Non-dental personnel with minimal training can easily supervise the procedures.
6. The procedures can be administered easily with minimal interruption of a school's academic program.

Although other methods of self-application of fluorides are available, this guide discusses only fluoride tablets and mouthrinsing with neutral sodium fluoride solutions because these two methods have been shown to be effective, simple and inexpensive.

This guide does not discuss dental caries or fluorides in depth. There are many excellent references on these subjects, some of which are listed in Appendix II.

DETERMINING THE NEED

To decide what kind of a SAF program is needed by your school district or community, the existing concentration of fluoride in the drinking water supply must first be determined. If the water consumed by children who will be in the SAF program is from a central supply, it is fairly simple to find out whether it is optimally fluoridated by contacting an official of the local water company or district. A call or a visit to the company listed on a household or school water bill is usually all that is necessary to obtain the information. If the water for the community is supplied from several sources, it is more difficult to obtain a definitive answer, for some consumers may be receiving water that is optimally fluoridated, and others, water that is not, or, if the water from multiple sources is mixed, the fluoride concentration may vary from time to time.

If most of the children are living in an area in which water is supplied primarily from private wells, then a small sample (5 percent to 10 percent) of randomly selected water samples should be obtained and sent to a laboratory at the local or state department of health for the testing of fluoride concentration. A local dentist, physician or other health practitioner can assist you with this procedure, or you can contact the state dental director for consultation (see Appendix I). If these attempts fail, there is at least one commercial firm that provides assistance in ascertaining the fluoride concentration of drinking water:

The Lorvic Corporation
8810 Frost Avenue
St. Louis, MO 63134

Upon request, this company will send to a dentist or physician a fluoride analysis form and directions for obtaining a sample of water. After a sample is submitted, a report of the amount of fluoride in the water will be sent to the requestor by return mail. There is no charge for this service.

After determining the level of fluoride in the drinking water consumed by children in a school district or community, one has a basis for deciding what type of SAF program should be initiated. The local dental society or a local dentist or physician should assist in determining the need for a preventive dental program. If a community lacks a dentist, dental society or physician, consultation can be obtained from the local health department or from the dental director of your state (see Appendix I). The outline on the adjacent page provides general recommendations for a SAF program, based on the fluoride concentration of the drinking water supply. It should be noted that several options for the use of fluoride tablets or mouthrinse exist for communities with inadequate amounts of fluoride in their water supply. For example, where the concentration of fluoride in water is in the range of 0.0 to 0.39 ppm, the recommended procedure is to provide fluoride tablets (1 mg. fluoride) for K-8th grade students and fluoride mouthrinse for students in 9-12 grades. Some communities do not wish to use the daily tablet procedure and, instead, provide the weekly fluoride mouthrinse for all grades (K-12). The decision of which regimen to use must be based on local needs and recommendations of professional personnel. It should also be noted that some communities that have optimally fluoridated water have initiated fluoride mouthrinse programs in hopes of providing additional protection against tooth decay to their students. The results of a few studies suggest that children who reside in optimally fluoridated communities may benefit from added protection of a fluoride mouthrinse. Additional studies now being conducted will provide us with more information. *(Continued on Page 6)*

OUTLINE FOR DETERMINING THE APPROPRIATE SELF-APPLIED FLUORIDE PROGRAM FOR USE IN SCHOOLS *

Level of fluoride in water supply	Recommended Procedure		Comments
	Tablets (Daily)	Mouthrinse ** (Weekly)	
0.0 - 0.39 ppm	√ 1 mg. fluoride	√	Children who live in areas with insufficient levels of fluoride in water should receive dietary supplements (tablets) in grades K-8 and fluoride mouthrinses in grades 9-12 or, if a tablet program is not feasible, fluoride mouthrinses for all grades, K-12.
0.4 - 0.69 ppm	√ 0.5 mg. fluoride	√	See above. If fluoride level is 0.7 and above, dietary supplements (tablets) should not be provided.
Optimally fluoridated, but not for sufficient time to provide adequate protection to all children		√	Children who have not had optimally fluoridated water since birth should receive protection of fluoride rinses.
Optimally fluoridated, but schools have a high proportion of students who either have transferred from fluoride-deficient areas or who currently reside where only trace levels of fluoride exist		√	Many communities with mobile populations have initiated a fluoride rinse program to provide protection for students who have moved from non-fluoridated areas. Continuous residents are likely to benefit as well (see below).
Optimally fluoridated		?	Limited research suggests that students may benefit from the added protection of a fluoride mouthrinse.

* General guide only, the ultimate decision must be determined by a knowledgeable dentist or physician based upon local needs.
** 0.2 percent neutral sodium fluoride solution.

(Continued from Page 4)

As the initiator of a SAF program, you will probably want to form a small committee to assist you. It is desirable that at least one of the persons on the committee has a background in general or dental health. However, each committee member must become well informed about SAF programs in order to explain the program to others and to answer questions that may arise. By becoming thoroughly familiar with all the contents of this guide, you will be reasonably well informed and will be able to explain and respond to questions.

OBTAINING NECESSARY SUPPORT FOR THE PROGRAM

An important step in initiating a SAF program is to obtain necessary local support for the program from such sources as the school board, superintendent of schools, the board of health, local dental society, principals, teachers and the local health officer. It is also useful to have the support of other local health societies such as medical, nursing, dental hygiene, dental assisting, pharmacy and parent-teacher groups. Determine which persons or groups are most likely to assist in getting a program started, and enlist their help. Generally, school boards meet at regular intervals. Find out who the chairman or president of the board is and ask for time to discuss at the next meeting of the possibility of implementing a SAF program.

Presenting the Merits of a SAF Program to the School Board

The following topics or points should be discussed with the school board. At least an hour should be allotted for an adequate presentation.

1. Discuss the prevalence of tooth decay and the loss of teeth because of decay (see Introduction and include local decay rates if the information is available).
2. Discuss the importance of the role of fluoride in preventing tooth decay and lowering the costs to families and the community in repairing decayed teeth.
3. Show the film—Topical Fluorides for Caries Prevention (see Appendix III).
4. Explain the consultants' recommendation (tablets, mouthrinsing or combination) for a SAF program.
5. Describe the procedure(s).
6. Demonstrate the procedures and ask those in attendance to participate in the demonstration.
7. Provide the costs of materials for the recommended program (see Appendix IV) and discuss ways to fund the program.
8. Provide leaflets on fluoride mouthrinsing, fluoride tablets and other background information (see Appendix III).
9. Provide information on how a SAF procedure is conducted in school, what kinds of personnel are needed to supervise the program and how much time is involved.
10. Discuss the need for a parent-consent form and show the examples.
11. Discuss what grades should participate in the SAF program.
12. Discuss storage of materials.
13. Answer any questions. If you do not know an answer to a particular question, say so, but offer to find out the answer.

Undoubtedly, a major concern of the school board will be the question of how to finance the SAF program. If the board elects to underwrite the costs of it, there is no problem. However, with rising costs many school boards are not eager to fund new programs. Information on possible alternative funding mechanisms can be found on page 14.

After a school board has given its approval for a SAF program, additional informational programs should be conducted for faculty, staff and parent groups. The content of these programs should be similar to the one that was conducted for the school board. Parents can also be informed about the preventive program through:

1. Newsletters from school to home
2. Newspaper articles
3. Posters placed in schools, municipal buildings, supermarkets, etc.
4. Radio and television announcements

REMEMBER, THE MORE INFORMED YOUR COMMUNITY IS, THE MORE LIKELY YOU ARE TO HAVE 100 PERCENT PARTICIPATION IN THE PROGRAM.

GRADES THAT SHOULD BE INCLUDED

Ideally, all students should be included in the SAF program. If, however, the potential student population is extremely large, you may wish to start the program on an incremental basis. For instance, in the first year, begin the program in grades K-6; the next year include grade 7; in the third year include grade 8 and so on (see chart on adjacent page). In addition to beginning the program on a smaller scale, this approach may offer another advantage. Some health authorities believe that it is very difficult to conduct SAF programs in junior and senior high schools. If students begin the program in earlier grades, however, the procedures become a part of their regular school activities and the chances for continuation of the program for older students will be greater. It is noteworthy that many schools conduct SAF programs in all grades with relative ease.

Another way is to initiate a SAF program in communities with many schools is to begin the program the first year in 50 percent of the schools. For the second year, an additional 25 percent of the community's schools are added and in the third, the remaining 25 percent.

CONSENT FORMS

A consent form or permission slip signed by a parent or guardian must be received before a child can be enrolled in a SAF program. Sample forms are shown on pages 9-11 to indicate what is generally considered to be necessary information to include on a consent form. Any consent form, of course, must reflect local needs and standards. It is advisable to request that the consent form be returned regardless of whether permission for the child's participation is granted. Otherwise, you will not know whether the form ever reached home for the parent to see. In addition to sending a consent form home with each child, you may wish to consider having a copy of the form published in the local newspaper along with a notice of the program. Such a notice will permit the parents of children who did not receive or who misplaced their form an opportunity to be informed of the SAF program.

EXAMPLE OF INITIATING A SAF PROGRAM ON AN INCREMENTAL BASIS

Year of Program	School Grade												
	K	1	2	3	4	5	6	7	8	9	10	11	12
1	X	X	X	X	X	X	X						
2	X	X	X	X	X	X	X	X					
3	X	X	X	X	X	X	X	X	X				
4	X	X	X	X	X	X	X	X	X	X			
5	X	X	X	X	X	X	X	X	X	X	X		
6	X	X	X	X	X	X	X	X	X	X	X	X	
7	X	X	X	X	X	X	X	X	X	X	X	X	X

SAMPLE FORM 1

Heading and Address of Local School
(on school stationery)

Date

Dear Parent:

The ..... Public School System in cooperation with the .... (Local or State) Board of Health and the ..... Dental Society is offering to all students a fluoride mouthrinsing program to prevent dental decay. This simple method of applying fluorides has been demonstrated to be safe and effective in controlling tooth decay. Participants will rinse their mouths in school with a 0.2% neutral sodium fluoride solution for one minute once each week under supervision. The solution is not swallowed. A leaflet explaining fluoride mouthrinsing is attached for your information.

This project is very important to the oral health of your child. Participation is entirely voluntary and without cost to you. We encourage you to allow your child to participate in this valuable health project. This preventive program, however, should not take the place of regular dental care by your dentist or proper home care. Please return the completed form without delay to your child's teacher.

If you have questions regarding this project, please call .....

Sincerely,

Superintendent

..... Public School System

☐ I *wish* my child to participate in the fluoride mouthrinse program

☐ I *do not wish* my child to participate in thefluoride mouthrinse program

Name of Child ..... Age .....
(Last) (First) (Initial)

Date of Birth ..... Sex ..... Grade .....
(Month) (Day) (Year)

Name of School .....

Teacher .....

Signature of Parent or Guardian .....

PLEASE COMPLETE AND RETURN THE FORM BY .....

SAMPLE FORM 2

Heading and Address of Local School
(on school stationery)

Date

Dear Parent:

The ..... Public School System in cooperation with the ..... (Local or State) Board of Health and the ..... Dental Society is offering to all students a fluoride mouthrinsing program to prevent dental decay. This simple method of applying fluorides has been demonstrated to be safe and effective in controlling tooth decay. Participants will rinse their mouths in school with a 0.2% neutral sodium fluoride solution for one minute once each week under supervision. The solution is not swallowed. A leaflet explaining fluoride mouthrinsing is attached for your information.

This project is very important to the oral health of your child. Participation is entirely voluntary and costs $..... per child per school year. We encourage you to allow your child to participate in this valuable health project. This preventive program, however, should not take the place of regular dental care by your dentist or proper home care. Please return the completed form along with the $..... without delay to your child's teacher.

If you have questions regarding this project, please call .....

Sincerely,

Superintendent

..... Public School System

☐ I *wish* my child to participate in the fluoride mouthrinse program and I enclose $..... for this service.*

☐ I *do not wish* my child to participate in the fluoride mouthrinse program.

Name of Child ..... Age .....
(Last) (First) (Initial)

Date of Birth ..... Sex ..... Grade .....
(Month) (Day) (Year)

Name of School .....

Teacher .....

Signature of Parent or Guardian .....

*[If payment by check is acceptable, designate to whom or to what the check should be made.]

PLEASE COMPLETE AND RETURN THE FORM BY .....

SAMPLE FORM 3

Heading and Address of Local School
(on school stationery)

Date

Dear Parent:

The ..... Public School System in cooperation with the .... (Local or State) Board of Health and the ..... Dental Society is offering to all students a fluoride tablet program to prevent dental decay. This simple method of providing fluoride has been demonstrated to be safe and effective in controlling tooth decay. Participants will chew the tablet then rinse the resultant solution in their mouth for one minute before swallowing each day under supervision. A leaflet explaining fluoride tablets is attached for your information.

Fluoride tablets should not be given to a child *both* at home and in the school on the same days. Therefore, if your child is receiving fluoride tablets at home he or she should not participate in the tablet program in school. Or, you may wish to discontinue the use of tablets at home on school days and let your child participate in the program at school.

This project is very important to the oral health of your child. Participation is entirely voluntary and without cost to you. We encourage you to allow your child to participate in this valuable health project. This preventive program, however, should not take the place of regular dental care by your dentist or proper home care. Please return the completed form without delay to your child's teacher.

If you have questions regarding this project, please call .....

Sincerely,

Superintendent

..... Public School System

☐ I wish my child to participate in the fluoride tablet program.
☐ I *do not wish* my child to participate in the fluoride tablet program.
☐ My child takes fluoride tablets at home.

Name of Child ..... Age .....
(Last) (First) (Initial)

Date of Birth ..... Sex ..... Grade .....
(Month) (Day) (Year)

Name of School .....

Teacher .....

Signature of Parent or Guardian .....

| THIS FORM CAN BE CHANGED TO ACCOMMODATE THE NEED FOR COLLECTING THE FEE—SEE FORM 2 FOR SUGGESTIONS. |

PLEASE COMPLETE AND RETURN THE FORM BY .....

Recommended Procedure for Distribution and Collection of Consent Forms

At least one month before the program is scheduled to begin, the consent forms should be developed. Forms are generally reproduced on local school stationery. Make approximately 25 percent more forms than the number of possible participants. An extra supply of forms will be needed for second notices and for students who enroll in school after the program starts. If leaflets (see Appendix III) describing fluoride mouthrinsing or the use of fluoride tablets are going to be used, they should be stapled to the consent form.

Have the forms delivered to each school on a Monday for distribution to the children on Tuesday. Tuesday is recommended rather than Monday because Monday is generally a day of high absenteeism. Request the principal, his secretary and the teachers to remind the students that the forms are to be returned by the following Thursday. The deadline for return may also be stated on the form. It is most important to make personal contact with the school principals or assistant principals, the secretary and the teachers to encourage a timely distribution and collection of the forms. Merely mailing or routing the forms to the schools or just dropping them off and hoping for the best usually does not work. Remember, a child should not participate unless there is a signed consent form on file.

Many consent forms and other kinds of information sent home from schools never reach their destination. If the first form is not returned by Thursday, a second form should be sent home that day. If the second form is not returned by the next day, a phone call to the parent is in order. There should be a known status of participation for all children.

The forms should be separated into participating and non-participating groups, and subsequently they should be alphabetized by group and filed for possible future reference. A master list of the participants should be made for each school (and for each teacher if the program is conducted in the classroom). The chart on page 13 illustrates an approach to distributing and collecting the consent forms. Remember, the goal should be 100 percent participation!

SUGGESTED SCHEDULE FOR DISTRIBUTING AND COLLECTING CONSENT FORMS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	Develop form & have approved by program authorities.		**1** Reproduce required number of forms on local school stationery.	**2**	**3**	**4**
5	**6** Take forms to schools for distribution on Tuesday. Talk with school faculty & staff of importance of return of forms.	**7** Have forms distributed to students by teachers.	**8** Teachers collect forms.	**9** Teachers collect forms. Send 2nd form home with child if one has not been returned.	**10** Collect all forms from schools. Get list of children & teachers who are not accounted for. Obtain phone numbers for these children.	**11**
12	**13** Initiate follow-up phone calls to parents of children unaccounted for. Mail additional forms as necessary.	**14**	**15**	**16**	**17**	**18**
19	**20** Alphabetize forms according to participants & non-participants. Develop a master list of participants for each school & teacher.	**21**	**22**	**23**	**24**	**25**
26	**27** Distribute lists to schools, request any necessary revisions.	**28**	**29**	**30**	**31**	

FUNDING

Many possibilities exist for funding a SAF program. These suggestions may or may not be "right" for your community, but they should stimulate ideas as to how YOUR program can be underwritten.

A SAF program can be SELF-SUPPORTING, which truly can make it a local community project. One way to make the program self-supporting is to charge each participant a fee to cover the costs of the program. Because the fee can be quite low, particularly if no salaries are included, almost all families can afford it. In those cases where a family simply cannot pay for the program for their children, but wants their children to participate, alternative funds must be found. No child should be deprived of the benefits of the program because his or her parents cannot afford it.

Alternative methods for making the SAF program self-supporting may be used. Rather than charge a small fee per child, an annual community project to raise funds can be undertaken. These projects may consist of:

1. A rummage sale
2. A spaghetti dinner
3. An auction
4. A fun or carnival night at a local school
5. A pancake breakfast

Obviously, the more items that are donated for these projects, the more money will be available for the SAF program. Volunteer help should be recruited to conduct these fund raising projects.

If the program is self-supported, a procedure for taking care of the money is essential. Some communities have elected to establish a separate account with the PTA/PTO finance committee. The incoming and expended funds are then channeled through an existing system. Other communities have established a bank account solely for use of the SAF program.

There are other funding mechanisms. Frequently, child-youth programs such as a SAF program can be funded with state money. To determine if this is possible, check with your local school board, health department or state dental director. The more possibilities you explore, the greater are your chances of locating funds. Some communities have been fortunate to have local charitable groups financially support their SAF program. In addition, consider all of the following as potential sources for funding: parent-teacher groups, service clubs, labor unions, sororities, foundations, health related societies such as dental, medical, nursing and dental hygiene. Frequently, the wives of dentists and physicians have their own auxiliary organizations that are active and interested in worthwhile health projects. Most persons and groups are greatly interested in assisting programs that are beneficial to children and youth. You CAN find funding for your SAF program if you persist.

PROGRAM COSTS

The total costs for either the 0.2 percent neutral sodium fluoride mouthrinse or the sodium fluoride tablet program will depend upon:

1. What agents are purchased

   Fluoride mouthrinse. Supplies necessary to conduct a fluoride mouthrinse program range from less than $0.50 to $1.00 per child per school year. If a fluoride powder or liquid concentrate is purchased and the mouthrinse solution is mixed in school, the cost is much less than if ready-to-use solutions are purchased.

   Fluoride tablets. The cost of fluoride tablets varies widely, and range from less than $0.50 to $3.60 per child per school year. Most brands, however, cost approximately $1.00 per child per school year.

   A list of suppliers can be found in Appendix IV.

2. Personnel costs
   Most SAF programs rely on volunteers to conduct the program. If salaries must be paid to individuals to conduct the program, then the total costs will be increased considerably.

MATERIALS AND SUPPLIES

MATERIALS AND SUPPLIES NECESSARY FOR EACH PROGRAM

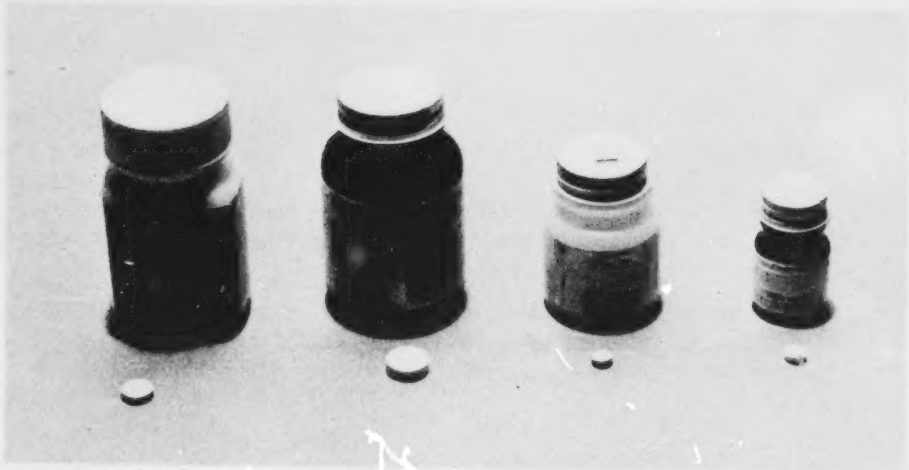
FLUORIDE TABLET	FLUORIDE MOUTHRINSE
Consent forms Forms to record procedure Fluoride tablets—1 tablet/child/school day Timers or clocks with sweep hands	Consent forms Forms to record procedure Sodium fluoride packets Polyethylene containers with calibrated plunger 2 oz. paper cups Napkins, 3 ply, 13"x13" Plastic bags (for disposable items) Timers or clocks with sweep hands Cafeteria trays Cart(s) with wheels (optional)

Ordering Supplies

To avoid having to reorder supplies during the school year, it is suggested that the largest quantity of supplies that can be properly stored should be ordered at one time. Because prices are often lower when ordering larger quantities, the public health price list should be requested when contacting the suppliers. Be certain that the firms you deal with know that you are purchasing products for a non-profit, school-based program.

Storage of Supplies

Both the fluoride tablets and the fluoride powder or liquid concentrate should be kept in a locked storage area that is located in an area with normal room temperature; extreme heat or cold should be avoided. The other supplies, such as paper products, should be stored in a dry, secure place.



Chewable fluoride tablets that yield 1 mg. of fluoride are available in several flavors and different sizes.

Materials for the fluoride mouthrinse program.

ESSENTIAL PERSONNEL FOR THE SAF PROGRAM

One person, an employee or a volunteer, should have overall responsibility for co-ordination of the program's activities. Currently employed school nurses or dental hygienists often assume this responsibility. Some communities hire someone, full or part-time, for this position. Whether an additional employee is needed frequently depends upon the number of participating students and the number of schools involved in the SAF program. Whether an employed supervisor is needed full or part-time is also dependent on these two factors. In some locations, a local health officer provides overall supervision.

Program co-ordinators are responsible for seeing that the following activities are accomplished:

Mouthrinse Program

- Ordering supplies
- Mixing and dispensing solution
- Supervising the mouthrinse procedure
- Recording procedure

Tablet Program

- Ordering supplies
- Dispensing tablets to classroom
- Supervising the tablet taking procedure
- Recording procedure

Before recruiting personnel to work in the SAF program, it is best to survey what resources of personnel might already be available to assist in conducting the program, such as:

- School nurses
- School hygienists
- Teachers
- Teachers' aides
- Health aides
- Mature students
- Other faculty or staff members

Although the program co-ordinator usually orders the supplies and distributes them to each school on a regular basis, frequently, teachers, teachers' aides, health aides or volunteers mix and dispense the fluoride solution or tablets. Other persons who can prepare and distribute the fluoride materials include parents, local college students and retirees. Many parents, particularly mothers, are very willing to give their time to a worthwhile effort. College students are especially eager to become "involved" and assist in a community program helping children. Retirees are another excellent source for volunteer help. Many retirees are vitally interested individuals who are looking for a worthwhile activity. Do not overlook any of these groups . . . and perhaps others.

If you live in a large community, it may help to list the SAF program with a local volunteers' association, which may assist in locating volunteers. In addition, some communities have found it useful to advertise for volunteers in parent-teacher bulletins and local newspapers and on radio, television and bulletin boards found in supermarkets, apartment buildings, laundromats and dormitories.

TRAINING PROGRAM STAFF

Everyone who has some responsibility in the SAF program must receive adequate training. This training may be accomplished through workshops which are relatively easy to conduct. Consider conducting a workshop during the day and in the evening, in order to accommodate the participants. One person or a small committee should have responsibility for co-ordinating the workshop(s). Suggested duties include:

1. Determining the workshop agenda
2. Securing a suitable location for the workshop
3. Obtaining speakers for the workshop
4. Ordering materials and equipment for the workshop
5. Informing the workshop participants of the date, place, time and agenda of the workshop
6. Conducting a brief meeting of the speakers prior to the workshop to ensure that all understand the procedures and their role at the workshop

Suggested Workshop Agenda

1. Present and discuss the objectives of the workshop.
2. Discuss the prevalence of tooth decay and the loss of teeth and its consequences because of decay.
3. Explain the role of fluoride in preventing tooth decay.
4. Describe the use of self-applied fluorides in schools.
5. Show the film—Topical Fluorides for Caries Prevention (see Appendix III for details about ordering).
6. Describe the SAF method(s) to be used.
7. Demonstrate the SAF procedures including mixing and dispensing the solution. Have the participants practice the procedures, including rinsing with the solution in the recommended manner. If fluoride tablets are to be used, have the participants use the tablets.
8. Emphasize the importance of doing each step properly and explain how to monitor the correct use of the mouthrinse or tablets.
9. Provide discussion time for any questions that are raised.

Facilities for the Workshop

The room should be large enough to comfortably accommodate the participants. There should be tables on which to place the SAF materials for demonstration purposes. Water should be available nearby for mixing the solution and a projection screen or blank wall for showing the film.

Workshop Faculty

Those persons who are thoroughly familiar with the SAF procedures are essential for the workshop faculty. They might include:

—Local, state or federal health or educational officials

—Local dentists or other health practitioners

—Trained community volunteers

Materials and Equipment Needed for the Workshop

—Copies of the workshop agenda

—Film (see Appendix III)

—Movie projector and screen

—Leaflets (see Appendix III)

—SAF materials (see Appendix IV)

—Forms for recording student participation

—Printed instructions for the SAF procedure

MIXING AND DISPENSING THE FLUORIDE SOLUTION

WHEN:

Although the mixed solution has a long shelf-life, unmixed sodium fluoride requires far less storage space. Thus, it is best to mix the solution on the day it is to be used. If the solution is prepared, dispensed and delivered to the classrooms before school begins, the rinsing procedure can be done when the pupils arrive—in this way, little classroom time is used. This scheduling is particularly appropriate when working with older students who have home room for the first 10-15 minutes of the school day.

HOW:

1. Remove cap.
2. The polyethylene container is filled with tap water up to the level of the water line indicated on the container. The neutral sodium fluoride powder in the packet is then emptied into the container, which makes a 0.2 percent solution. The water lines are indicated on the mixing container. The amount of water required is based on the amount of sodium fluoride powder in the packet:

Size of Fluoride Packet	Amount of Water
2 gram packets	1000 ml. (1 quart)
3 gram packets	1500 ml. (1.5 quarts)
4 gram packets	2000 ml. (2 quarts)

All of the above combinations make a 0.2 percent sodium fluoride solution.

3. Replace cap securely and shake container to dissolve all the powder thoroughly.
4. Remove cap and insert pump; tighten pump cap.
5. Prime the pump by pushing the plunger up and down a few times until the solution flows freely. The pump will now dispense the correct amount of the solution for each student's use with each stroke of the pump (5 ml. or 1 teaspoonful for pre-school and Kindergarten children; 10 ml. or 2 teaspoonsful for grades 1-12).

If liquid concentrate is used, follow the directions on the concentrate container.

REMEMBER, ALTHOUGH THIS IS A VERY SIMPLE PROCEDURE, IT MUST BE DONE PROPERLY. MEASURE THE WATER CAREFULLY; MIX THOROUGHLY.

WHERE:

It is recommended that the solution be mixed and dispensed into paper cups at a central area and then delivered to the individual classroom. The filled cups are placed on a tray that is identified with the teacher's name and room number. The number of cups placed on each tray should be based on the number of participating students in the designated classroom. For example, if there are 26 students in Ms. Brown's room (Room #12) who participate in the mouthrinse procedure, the tray labeled Ms. Brown, Rm. 12, should have 27 cups of solution—twenty-six for the students and one for Ms. Brown. The tray with the cups of solution and the napkins can be delivered to the classroom by an aide or be picked up by a student designated by the classroom teacher. A supply of plastic bags (for disposal of the cups) can be kept in the classroom. If a cart is available, it is convenient to stack the filled trays on the cart and simply "wheel" the trays to the appropriate rooms.

If, however, the rinsing procedure is to be conducted in an auditorium or lunchroom, then the mixing and dispensing can be done right in that room. The mixing and dispensing into the paper cups should be done before the students arrive to reduce the amount of time they are gone from class. If a large number of students all rinse at the same time, enough supervisory personnel must be available to monitor the procedure adequately. No more than 30 students per supervisor is recommended.

Another method of delivering the mixed solution to the classroom is to provide a dispensing container with the solution in it, empty cups and napkins on a tray to each classroom. This method is acceptable, but it does require more of the teacher's time (to dispense the solution into the cups) and it also requires the purchase of more polyethylene containers and pumps.

CONDUCTING THE WEEKLY MOUTHRINSING PROCEDURE

WHEN:

It is best to designate a specific day of the week for the fluoride mouthrinsing procedure. Because absenteeism is high on Mondays and Fridays, it is wise to select some other school day.

Many schools prefer to conduct the mouthrinsing procedure immediately after school begins in the morning. Whichever day and time is selected, it should remain consistent. The mouthrinse, or tablets should be used at a time when eating or drinking is not scheduled for at least 30 minutes after the procedure. Hence, the procedure should not be scheduled just before a recess or lunch.

HOW:

Before actually beginning the program, the participating students should receive adequate information about the SAF procedures. This orientation can be scheduled just before the first rinsing session. An orientation session can help ensure student co-operation and a smoothly operating program. It has been found useful by many communities to conduct a "practice session" of the mouthrinsing procedure using plain water, before initiating the first weekly session. The practice session has been found to be particularly helpful in working with younger (Kindergarten and first grade) children. A "tell-show-do" approach can be used, that is, explain the procedure, demonstrate it and then have the students carry out the rinsing procedure with plain water. In addition, it is suggested, particularly with younger children, that each child's nasal passage be clear before beginning the rinsing. This is particularly important during the winter months when many children have colds. Reminding the children before the mouthrinsing procedure begins to use a tissue to blow their noses (if necessary) is a simple way to avoid their not being able to breathe during the rinsing, and thus inadvertently swallowing the solution and possibly choking or spitting out the solution.

How the cups of fluoride mouthrinsing solution are distributed to each student can be determined by the classroom teacher. Some teachers do it themselves while others allow students to take turns in dispensing the cups from the tray. Other teachers have the students come to her desk to pick up their own cup and napkin. Any organized method is fine. For both the practice session and the regular sessions the following sequence has been found to work well:

1. After each participating student and teacher have a cup containing the fluoride solution and a paper napkin, the teacher (or other rinse supervisor) reminds the students not to swallow the solution and to forcefully strain the solution between their teeth until she signals them to stop.
2. All participants empty the contents of the cups into their mouths at the same time. The *one* minute timing begins at this point. During this process, the rinse supervisor who also acts as "a model of how to rinse," observes the students to make certain that they are rinsing properly. The solution must reach all surfaces of the teeth, and this is accomplished by puffing the cheeks and lips rhythmically. The supervisor should watch for children who have little cheek and lip movement. A child may occasionally resort to shaking his head back and forth rather than using a cheek and lip motion. These inappropriate actions should be corrected by the supervisor.
3. When 60 seconds have elapsed, direct the students to empty the solution back into the cup, blot their lips with the napkin and gently stuff the napkin into the paper cup to absorb the liquid.
4. The cups are then placed into a plastic waste bag (students may take turns collecting the cups) for disposal.
5. Participation is recorded on the SAF enrollment form (see pages 23-24).
6. The trays are then returned to the central mixing area.

DISPENSING AND CONDUCTING THE DAILY FLUORIDE TABLET PROCEDURE

WHEN:

Most schools elect to have the fluoride tablets taken as soon as class starts in the morning. It is easy to remember, and it is a convenient time because of the rule of no eating or drinking for 30 minutes after taking the tablet.

HOW:

The procedure should be explained thoroughly each day for the first few days of the program. The supervisor should emphasize to the students that the fluoride solution/saliva produced in their mouth as a result of chewing the tablet should *not* be swallowed until they are so directed.

1. The designated supervisor (teacher, health aide, volunteer parent, etc.) distributes a tablet to each student who is participating in the program.
2. Students put the tablet in their mouths at the same time and begin chewing for 30 seconds.
3. The supervisor then signals the students to forcefully strain the resultant solution (of the tablet dissolved in saliva) between their teeth for 30 seconds.
4. At the end of the *one* minute chewing-swishing procedure, the students are directed to swallow the solution.
5. Participation is then recorded on the SAF enrollment form.

RECORDING THE USE OF THE SELF-APPLIED FLUORIDE

Each community should decide whether a record should be kept of each student's use of the designated SAF agent. Before making a decision consideration should be given to the following questions:

—For what purpose will the information be used?

—Who is going to record the information?

—How and where is the information going to be recorded?

—Who is going to collect the records?

The information can serve to measure the success of the program in terms of how many children participated annually and at what frequency. Usually, the classroom teacher records the use of the SAF agent. Some schools have students record their own participation. Many communities, however, do not believe it is necessary to record the procedure.

Several methods of recording this information are presently in use. Samples of various recording forms for the weekly fluoride mouthrinse procedure are shown on the next few pages. A similar form may be used for recording the daily use of fluoride tablets. One simple method that is sometimes used to record treatments is to ask the classroom teachers to make a special mark in her attendance record next to the names of all students who are participating in the SAF program. Because the teachers take daily attendance, it is easy at the end of the year to go through the attendance record and provide an account of the days missed by each student. A sample of this form and directions for its use are on pages 25-26. The completed form can be collected by the program coordinator.

FLUORIDE MOUTHRINSE PROGRAM
CLASSROOM TREATMENT RECORD

TEACHER _____ GRADE _____ SCHOOL _____ COUNTY _____

AUGUST, 19__ - JUNE, 19__

NAME	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN

FLUORIDE MOUTHRINSE
TREATMENT RECORD

19__ - 19__ SCHOOL SESSION

24

School_____ Teacher_____ Grade _____

Participants — Rinsed? Yes (+) No (—) — School Week

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1.																																				
2.																																				
3.																																				
4.																																				
5.																																				
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14.																																				
15.																																				
16.																																				
17.																																				

INSTRUCTIONS (for form on the following page)

This method, described on page 22, records only the treatment days missed by each student.

1. Please list on the roster in ALPHABETICAL ORDER *ALL* children in your room PARTIPATING IN THE TABLET (RINSE) PROCEDURE.

2. TABLET DAYS MISSED

   For each child list the total number of days absent from the start of tablet procedure for the school year.

OR

3. MOUTHRINSE DAYS MISSED (if mouthrinsing is done on Tuesdays)

   For each child list the total number of *Tuesdays* absent from the start of mouthrinsing procedure for the school year.

4. COMMENTS

   Please note date when:

   (a) Student discontinues participation in the SAF program.

   (b) Student moves away.

   (c) New student enters program.

SAMPLE FORM

DENTAL PROGRAM ROSTER
19 - 19 SCHOOL SESSION

School _____ Teacher _____ Grade _____

	Participants	Tablet Days Missed	OR	Mouthrinse Days Missed	Comments
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					

MONITORING THE SAF PROGRAM

Monitoring of the SAF program is strongly recommended. Although all of the procedures involved in conducting either a fluoride mouthrinse program or a fluoride tablet program are simple to learn and execute, it is only logical to observe the actual procedures at periodic intervals. The program co-ordinator should routinely visit each school participating in the SAF program to observe the program. The co-ordinator should note any procedure that is not being done correctly and take necessary action to correct it. Moreover, any questions or problems of the students or school personnel that may have arisen since the previous visit can be discussed. The periodic visits of the co-ordinator help ensure quality of the program and they are also a strong indicator to the students and the faculty that the program *is* important.

ADDITIONAL PROCEDURES TO ENHANCE ORAL HEALTH

Remember that if the self-applied fluoride procedure is properly executed, a sizable reduction in tooth decay can be expected. These programs, however, are in no way intended to take the place of routinely performed oral hygiene procedures done at home or of regular dental appointments.

To further enhance the total oral health of both children and adults, the following practices are suggested:

1. Thorough Removal of Dental Plaque

Thorough, regular plaque removal is important for the maintenance of disease-free gums. Therefore, plaque removal procedures using a toothbrush, dental floss and disclosing agents are essential. Ideally, dental plaque should be removed at least once a day. Fluoride toothpaste should be used.

2. Serve and Eat Sweets Only at Meals

Eating sugar-sweetened foods between meals is particularly dangerous to oral health. Children and adults who are susceptible to tooth decay will develop fewer cavities if they AVOID sweet, sticky snack foods. Parents and school authorities are strongly encouraged to regard these food items as harmful to health and to discourage their use. If sweets must be consumed, they should be eaten only at meals as a part of a well-balanced diet. If candy machines are presently in the schools in your community, necessary action should be taken to have them replaced with machines that sell non-decay producing foods such as fruits, nuts, milk or sugar-free soft drinks. A list of healthy snack foods is listed in Appendix V.

3. Continue Regular Professional Care

Periodic examinations by the family dentist are important to oral health.

APPENDIX I

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APPENDIX II

REFERENCES

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APPENDIX III

LIST OF EDUCATIONAL AIDS

Leaflets

"Fluoride Mouthrinsing in Schools . . . Protection for Children's Teeth"

Description: This publication is designed to provide adults with a brief description of weekly mouthrinsing with 0.2 percent neutral sodium fluoride and its benefits. A copy of the leaflet is in the pocket of the back cover of this guide.

Suggested Use: This leaflet may be made available to adults attending meetings where the mouthrinsing program is to be discussed, such as school board, PTA/PTO, faculty or workshops. The leaflet may also be used to send home with the parent-consent forms. Copies, in limited quantity, may be obtained from:

National Caries Program
National Institute of Dental Research
National Institutes of Health
Bethesda, MD 20014

"Fluoride Tablets . . . A Healthier Smile for School Children"

Description: This leaflet briefly explains the benefits and use of fluoride tablets. A copy is in the pocket of the back cover of this guide.

Suggested Use: This leaflet may be distributed to adults attending meetings in which the fluoride tablet program is being discussed. The leaflet may also be sent home with the parent-consent form. Copies, in limited quantity, may be obtained from:

National Caries Program
National Institute of Dental Research
National Institutes of Health
Bethesda, MD 20014

"Fluoride to Protect Your Children's Teeth"

Description: This leaflet explains briefly the various methods of using fluoride such as: community fluoridation, school fluoridation, fluoride supplements and topical fluorides. A copy of the publication is in the pocket of this guide.

Suggested Use: This leaflet is written for adults and it helps acquaint parents with the various ways that fluoride can be used to provide protection against tooth decay. Copies, in limited quantity, may be obtained from:

National Institute of Dental Research
National Institutes of Health
Bethesda, MD 20014

Film

"Topical Fluorides for Caries Prevention"
(16 mm, color, sound, 10 minutes)

Description: Dental caries afflicts over 95 percent of our children. Fluoride is our best weapon for preventing this nearly universal disease. The film provides basic information on topical fluorides for those persons who are interested in initiating a self-applied fluoride program in their communities. Two scientists explain the development and application of topical fluorides from laboratory studies to actual use in school-based programs. A teacher demonstrates how a fluoride mouthrinsing program is conducted in her classroom.

Suggested Use: The film is for adult audiences and is particularly valuable in explaining the why and how of school-based fluoride programs.

Availability: The film is available on short-term free loan from:

National Medical Audiovisual Center (Annex)
Station K
Atlanta, GA 30324
ATTN: Mrs. Betty Lovell

Copies of the film may be purchased at a cost of $45.50 plus postage from:

National Audiovisual Center
General Services Administration
Washington, DC 20409

APPENDIX IV

SOURCES FOR PURCHASING MATERIALS FOR 0.2 PERCENT NEUTRAL SODIUM FLUORIDE MOUTHRINSE

FIRM	MATERIALS AVAILABLE
Hoyt Laboratories 633 Highland Avenue Needham, MA 02194 (617) 444-8610	Ready to use sodium fluoride solution, flavored and colored.
Janar Company Dental Division P. O. Box 1845 Grand Rapids, MI 49501 (616) 698-6800	Ready to use sodium fluoride solution in individual packets, flavored and colored.
The Lorvic-Karidium Corporation 8810 Frost Avenue St. Louis, MO 63134 (314) 524-7444	Concentrated sodium fluoride and ready to use solution, flavored and colored, graduated polyethylene containers and plastic pumps.
Medical Products Laboratories 9990 Global Road Philadelphia, PA 19115 Toll Free: (800) 523-4884 In PA call Collect: (215) 677-5200	Sodium fluoride powder, plain or colored, graduated polyethylene containers, plastic pumps, paper cups, paper napkins and plastic waste bags.
PACEMAKER CORPORATION 2295 N.E. 194TH PORTLAND, OR 97230 TOLL FREE: (800) 547-5262 IN OREGON: (800) 452-3765	Concentrated sodium fluoride solution, flavored and colored, graduated polyethylene containers, plastic pumps and paper or plastic cups.

The paper cups and napkins and plastic trash bags also may be purchased through a school's usual source for these products. The plastic cafeteria trays can be purchased from any restaurant equipment firm.

When writing or calling for the public health price list be certain to find out if the price includes shipping costs.

COMPARATIVE SHOPPING IS A WISE PRACTICE.

SOURCES FOR PURCHASING FLUORIDE TABLETS

FIRM	SIZE AND FLAVOR
Clark Pharmaceuticals P. O. Box 1292 San Carlos, CA 94070 (408) 988-1119	Flavored, 1 mg. fluoride, scored (tablet can be halved to provide 0.5 mg. fluoride)
Fluoritab Corporation P. O. Box 381 Flint, MI 48501 (313) 239-9770	Flavored, 1 mg. fluoride
Hoyt Laboratories 633 Highland Avenue Needham, MA 02194 (617) 444-8610	Plain or flavored, 0.5 mg. fluoride and 1 mg. fluoride
Janar Company Dental Division P. O. Box 1845 Grand Rapids, MI 49501 (616) 698-6800	Flavored, 1 mg. fluoride
Kirkman Laboratories, Inc. 934 N.E. 25th Avenue Portland, OR 97208 (503) 233-4441	Plain and flavored, 1 mg. fluoride
The Lorvic-Karidium Corporation 8810 Frost Avenue St. Louis, MO 63134 (314) 524-7444	Plain, 1 mg. fluoride
Medical Products Laboratories 9990 Global Road Philadelphia, PA 19115 Toll Free: (800) 523-4884 In PA call Collect: (215) 677-5200	ain and flavored, 1 mg. fluoride
PACEMAKER CORPORATION 2295 N.E. 194TH PORTLAND, OR 97230 TOLL FREE: (800) 547-5262 IN OREGON: (800) 452-3765	Plain and flavored, 1 mg. fluoride
Unitek Corporation 2724 South Peck Road Monrovia, CA 91016 (213) 445-7960	Flavored, 1 mg. fluoride

When inquiring about public health costs, be certain to find out if the price includes shipping costs.

COMPARATIVE SHOPPING IS A WISE PRACTICE.

APPENDIX V

SUGGESTED LIST OF HEALTHFUL SNACK FOODS

Fresh Fruits

Apples
Berries
Cantaloupe
Grapefruit
Grapes
Oranges
Peaches
Pears
Pineapple
Plums
Tangelos
Tangerines

Fresh Vegetables

Carrots
Cauliflower
Celery
Cucumbers
Green Peppers
Peas
Radishes
Tomatoes
Turnips

Protein Foods

Cheese, Cottage Cheese, Yogurt (plain)
Eggs
Fish
Meats
Nuts
Poultry (chicken, turkey)
Soups & Dips made from dried beans, peas or lentils

Thirst Quenchers

Buttermilk and Plain Milk (low fat or skimmed)*
Fruit Juices, canned, fresh, frozen, but no sugar added.
(Look for the word "juice" when purchasing; the label indicating "fruit drink" usually says "sugar added".)
Vegetable Juices, without sugar

* Also "Protein Foods"

If, after reviewing the guide, additional assistance is needed, contact:

National Caries Program
National Institute of Dental Research
Westwood Building
5333 Westbard Avenue
Bethesda, MD 20034

Weekly mouthrinsing with 0.2 percent neutral sodium fluoride:

- *is inexpensive*
- *requires minimal time and effort*
- *provides effective protection against cavities*

National Caries Program
National Institute of Dental Research

DHEW Publication No. (NIH) 76 - 1131

Fluoride mouthrinsing in schools... protection for children's teeth

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

Drinking fluoridated water from birth is the best way to ensure having better teeth for life because this procedure will prevent 50–65% of tooth decay.

Unfortunately, nearly a quarter of all Americans live in areas that do not have central water systems, and thus cannot enjoy the health benefits of community water fluoridation.

For children who live in these areas, weekly rinsing with a 0.2 percent solution of neutral sodium fluoride in the school classroom is recommended for protection against cavities.

Benefits from mouthrinsing with dilute solutions of neutral sodium fluoride have been repeatedly demonstrated by careful research during the past 10 years.

Results show that children who rinse weekly with the fluoride solution may expect to have 20 to 50 percent fewer cavities than otherwise expected.

Weekly mouthrinsing with a fluoride solution in school is an attractive program because:

- *The procedure is inexpensive—the materials cost less than 50¢ per child per school year.*
- *Few materials are needed.*
- *Little time is required for the procedure — approximately 5 minutes per week for an average class.*
- *Mouthrinsing is easy for school children of all ages to learn and to do.*
- *Non-dental personnel, including classroom teachers and parents, with minimal training can easily supervise the procedure.*

For more information on how to initiate a fluoride mouthrinsing program in your school contact:

Your State or local health department
or
National Caries Program
National Institute of Dental Research
Westwood Building, 5333 Westbard Avenue
Bethesda, Maryland 20014

For more information on how to initiate a fluoride tablet program in your school contact:

Your local or state health department

or

National Caries Program
National Institute of Dental Research
Westwood Building
5333 Westbard Avenue
Bethesda, Maryland 20014

National Caries Program
National Institute of Dental Research

DHEW Publication No. (NIH) 77 - 1197

Fluoride Tablets... A Healthier Smile for School Children

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

Happy thoughts and healthy teeth are the basic ingredients of a child's appealing smile. No one can promise happy thoughts, although we can hope that every child will have many. We can, however, foster healthy teeth; there are procedures available that will assure better dental health by reducing tooth decay.

It is well established that the best way of preventing tooth decay is to adjust the amount of fluoride in a community's drinking water to proper levels. Drinking fluoridated water from birth can reduce tooth decay by as much as 65 percent. Of course, community water fluoridation can only be used in those communities that have central water distribution systems. Therefore, almost one-fourth of all Americans cannot have fluoridated water. Unfortunately, an additional one-quarter of the U.S. population is not benefiting from fluoridation because their communities have not yet adopted the procedure.

For children who live in fluoride-deficient areas, the use of fluoride tablets (during infancy drops are used instead of tablets) is an effective alternative method for prevention of tooth decay. The recommended procedure for using the tablet requires that it be chewed or dissolved in the mouth and the resultant solution is swished between the teeth for one minute before swallowing. When used in this manner fluoride tablets benefit teeth already present in the mouth as well as those teeth that are still developing. The greatest benefit—about 50–60 percent less tooth decay—occurs if the fluoride is given to the child by the parent each day from infancy until teenage. This approach is recommended in those situations where the families are highly motivated.

Because many families find the schedule too demanding and, therefore, do not follow it conscientiously, the best approach for most children is to give them a fluoride tablet each day in school. Many research studies have demonstrated that these school-based programs can reduce tooth decay by 20 to 35 percent. For best results the procedure should be started in kindergarten or first grade and continued until at least the eighth grade.

Giving fluoride tablets in school is a positive program because:

- *The procedure is safe and is effective in reducing tooth decay.*
- *The procedure is inexpensive.*
- *There are no waste products to dispose.*
- *Little time is required for the procedure—approximately 3 minutes per school day for an average classroom.*
- *The procedure is easy for school children of all ages to learn and to do.*
- *With minimal training, non-dental personnel, such as classroom teachers, aides or volunteers, can adequately supervise the procedure.*

Yes, a fluoride tablet program in school provides a unique opportunity to help children have a healthier smile. A healthy smile is a beautiful sight indeed. Please protect it.

FLUORIDE DENTIFRICES: The use of a fluoride containing dentifrice is recommended for everyone. Regular and thorough toothbrushing with a fluoride dentifrice will provide some protection against tooth decay regardless of whether or not other fluoride therapy is available.

PROFESSIONAL APPLICATION OF TOPICAL FLUORIDES: Dentists and dental hygienists often apply fluorides directly to the teeth after they are thoroughly cleaned. These topical fluorides are either in the form of gels, applied in mouth trays, or solutions painted directly on the teeth. Semi-annual applications of these fluorides also substantially reduce dental decay.

For individuals with very active decay, the dentist may recommend home use of a fluoride gel. Plastic mouthpieces, similar to an athlete's mouth guard, are individually fitted to the upper and lower jaws. These plastic trays are filled with a fluoride gel. Once the dentist has provided this equipment and simple instruction for its use, the decay-prone person takes five minutes a day to apply the gel.

The National Institute of Dental Research, one of the National Institutes of Health in Bethesda, Maryland, is studying other approaches and methods of fluoride use. One such possibility is the use of fluoride compounds that could provide a protective cover on the teeth for many hours, as well as ways to release fluoride gradually in the mouth. These efforts are part of a broad program to find better ways of preventing dental decay. For more information on any of these procedures contact: your dentist, state or local health department, or the National Caries Program, National Institute of Dental Research, National Institutes of Health, Bethesda, Maryland 20014.

National Institute of Dental Research

DHEW Publication No. (NIH) 76-1141

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 35 cents.

There is a minimum charge of $1.00 for each mail order.

FLUORIDE TO PROTECT YOUR CHILDREN'S TEETH

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

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Fluoride to Protect Your Children's Teeth

Fluoride is the most effective agent available to prevent tooth decay.

Generations of people benefited from drinking naturally fluoridated water without knowing what it was that gave them good teeth. It was only after many years of investigation by scientists at the National Institute of Health and elsewhere that it was determined that fluoride is responsible for protecting teeth from dental decay.

Fluoride is one of many elements naturally occurring in the earth, and is found in varying amounts in almost all waters and soils.

From extensive research it has been established that one part fluoride per one million parts (1 ppm) of water prevents up to 60 percent of the tooth decay that would ordinarily occur. Maximum protection against tooth decay is achieved when optimally fluoridated water is consumed from birth. Protection continues throughout life for persons who continue to live in fluoridated communities.

Communities with inadequate amounts of fluoride in their public water supply can achieve protection for their children's teeth by adjusting the fluoride content to the recommended level. This effective public health measure costs approximately 15-18 cents per person per year.

Because nearly one fourth of all Americans live in areas that do not have central water systems and therefore cannot enjoy the health benefits of community water fluoridation, various alternative methods of fluoride application have been developed.

SCHOOL FLUORIDATION: An alternative public health measure is school fluoridation. Schools that have an independent water supply can fluoridate it by installing the necessary equipment. More fluoride (approximately 4½ times the concentration used in public water supply) is recommended in the school water supply to compensate for the time that children are not in school. Several States in the U.S. have extensive school fluoridation programs.

FLUORIDE TABLETS AND DROPS: The use of dietary supplements of fluoride tablets or drops is also an effective measure against tooth decay. These supplements can be prescribed by your physician or dentist. Generally, fluoride drops are recommended for infants from birth until they are able to consume fluoride tablets. Fluoride tablets are prescribed for children up through 14 years of age, the years during which the permanent teeth are forming. For maximum effectiveness, the drops and tablets must be consumed daily. Because parents find it difficult to follow a protracted daily routine, public health programs in which fluoride tablets are provided to children in school, have been established in some areas. The tablets are first chewed and the resultant solution is swished in the mouth before it is swallowed. This procedure benefits the teeth that have erupted as well as those being formed in the jaws.

FLUORIDE CONTAINING MOUTHRINSES: Another effective method of increasing the resistance of teeth to decay is the use of dilute solutions of neutral sodium fluoride. Rinsing with fluoride can be done either daily or weekly depending upon the amount of fluoride in the solution. A 0.05 percent solution of neutral sodium fluoride is used for daily rinsing and a 0.2 percent solution is recommended for weekly rinsing. Studies show that children who rinse weekly with a fluoride solution will have 20-50 percent fewer cavities than usually expected. Fluoride mouthrinsing programs are easily conducted in schools and, in fact, thousands of children are participating across the country in weekly fluoride mouthrinsing programs. The procedure requires only about five minutes of school time each week. It is inexpensive and well accepted by teachers and students.

THE PREVENTION OF DENTAL CARIES BY MOUTHRINSING WITH SOLUTIONS OF NEUTRAL SODIUM FLUORIDE

HERSCHEL S. HOROWITZ, D.D.S., M.P.H.

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Introduction

Fluoridation of communal water supplies should be the foundation upon which all national programmes of dental caries prevention are based. Fluoridation approaches being an ideal public health programme in that benefits, in terms of protection against dental caries, are conferred regardless of family socio-economic level and education or the availability of dental manpower. Furthermore, no cooperative effort or direct action need be taken by the beneficiaries for the benefits to be derived. A shortcoming of water fluoridation is that its application is limited to areas with central water systems.

For geographic areas that lack central water systems, alternatives to fluoridation for the prevention of dental caries must be developed. School fluoridation, the fluoridation of salt and supervised programmes of fluoride tablet administration have all been shown to be feasible alternatives to community fluoridation, although they do not appear to be as effective as fluoridation in preventing dental caries, nor do they reach as many children with such ease.

For geographic areas where it is impossible to fluoridate the water or where the alternatives to fluoridation are not possible or practicable, the topical application to erupted teeth of various solutions and gels containing fluoride is another approach to prevention of dental caries. Substantial data have shown that topical applications of solutions of two per cent sodium fluoride, eight per cent stannous fluoride and acidulated phosphate-fluoride (1.23 per cent F ion) and the same concentration of an acidulated phosphate-fluoride gel, when professionally applied, produce an appreciable inhibition of dental caries (see Horowitz and Heifetz, 1972; Marthaler, 1971; Stookey and Katz, 1972 for reviews). One may reasonably expect a 30-40 per cent reduction in the increment of carious surfaces in groups of children residing in an area with low levels of fluoride in the water who receive professional applications of these agents.

Application of fluorides by health personnel has disadvantages in public health programmes because the treatments must be given individually and special facilities and equipment are required. For communities with adequate financial and manpower resources, however, a topical fluoride programme with any of the above-named agents can be recommended (World Health Organization, 1972).

The increasing shortage of professional health manpower and the relatively high cost of preventive-treatments accentuate the shortcomings of a professionally administered technic as a public health measure. In the search for methods to overcome these drawbacks, dental investigators have evaluated various self-application procedures for the delivery of topical fluorides, including:

1. mouthrinsing with fluoride solutions (Aasenden, DePaola, and Brudevold, 1972; Frankl, Fleisch, and Diodati, 1972; Horowitz, Creighton, and McClendon, 1971; Radike, et al., 1973; Torell and Ericsson, 1965; Torell and Siberg, 1962);
2. toothbrushing with fluoride solutions and gels (Berggren and Welander, 1960; Bullen, McCombie, and Hole, 1969; Heifetz, Horowitz, and Driscoll, 1970; Horowitz, Heifetz and McClendon, 1972; Marthaler, König, and Muhlemann, 1970);
3. toothbrushing with fluoride prophylaxis pastes (Muhler et al., 1970; Gunz, 1971; Peterson and Mellberg, 1971; Trubman and Crellin, 1973); and
4. the application of fluoride gels in mouthpieces (Englander, Keyes, and Gestwicki, 1967; Englander, et al., 1971; Trubman and Crellin, 1973).

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Mouthrinsing with Solutions of Fluoride

Of the investigated methods, a mouthrinsing procedure has the following advantages in school programmes:

1. Little time is involved for the preventive procedures.
2. The technique of application is easy to learn.
3. Few materials and supplies are required — the procedure is inexpensive.
4. Non-dental personnel with minimal training can easily supervise the procedure.
5. Frequent applications can be administered easily with minimal interruption of a school's academic programme.

And what is most important, mouthrinsing with dilute solutions of neutral sodium fluoride, either weekly with a 0.2 per cent solution or daily with a 0.05 per cent solution is effective in preventing the development of dental caries. Neutral sodium fluoride solutions are specified for mouthrinsing rather than solutions of stannous fluoride or acidulated phosphate-fluoride (APF) for three reasons:

1. More mouthrinsing studies showing efficacy have been done with neutral sodium fluoride than with the other two agents;

2. Sodium fluoride solutions may be formulated easily at schools, whereas, APF solutions are best formulated in a commercial laboratory. This fact considerably reduces costs.

3. Sodium fluoride solutions do not have the objectionable taste of stannous fluoride solutions, and thus, they do not require that sweetening or masking flavors be added.

Weisz (1960) reported that children in his pedodontic practice who used at home a 0.25 per cent solution of sodium fluoride twice a day as a mouthwash experienced large reductions in decay compared with other patients who did not use the mouthwash. An editorial note appended to Weisz's report called attention to the dangers of dispensing large and potentially dangerous amounts of fluoride for use at home. On the other hand, school-based mouthrinsing can be supervised by adults and the danger of accidental ingestion of toxic quantities by younger siblings at home is eliminated.

Fjaestad-Seger and co-workers (1961) were among the first researchers to report benefits from mouthrinsing in school with neutral sodium fluoride. They found that Swedish children who had rinsed their mouths under supervision once every other week (fortnightly) with either a 0.2 per cent neutral sodium fluoride or an iron fluoride solution showed 'significant reductions' in dental caries after one year. Torell and Siberg (1962) generally confirmed the value of mouthrinsing with a 0.2 per cent neutral sodium fluoride solution; in their study, children used the mouthrinse once every month in school under the supervision of a dental nurse.

Torell and Ericsson (1965) reported the results of a study in which several preventive agents and methods were evaluated. Included in the study was a group of children who engaged in daily, unsupervised rinsing at home (after evening toothbrushing) with a neutral 0.05 per cent sodium fluoride solution and another group who, under the supervision of dental nurses, underwent a fortnightly mouthrinsing at school with a neutral 0.2 per cent sodium fluoride solution. At the conclusion of the two-year study, children in the daily mouthrinsing group showed a 50 per cent reduction in mean incremental caries scores compared with children in the control group. Lesser benefits — a 21 per cent reduction in average new DMF surfaces — were found in children who rinsed fortnightly. Compared with the findings for other groups in the study who received professionally administered fluoride applications or fluoride-containing dentifrices, the daily mouthwashing procedure also yielded significantly better results.

Several other investigators (Rosenkranz, 1967; Koch, 1967; Ben-Hur and Andres, 1971) have substantiated the effectiveness of dilute neutral solutions of sodium fluoride in preventing dental caries. Our research group has completed two studies of mouthrinsing procedures. The first was initiated in 1967 in Portland, Oregon (Horowitz, Creighton and McClendon, 1971). Participants in the 20-month evaluation were children in Grades 1 and 5 who were assigned to one of two groups. The test group rinsed in school for one minute once a

week with a 0.2 per cent sodium fluoride solution (0.09 per cent fluoride ion). A comparable group of controls rinsed monthly with a sodium chloride solution.

The solutions were delivered by personnel of the State Board of Health to the schools in 1-gallon, polyethylene bottles fitted with spring-loaded, 10 ml. pumps. The only other supplies needed were napkins and paper cups. The cost of supplies and materials was estimated at 31 cents per child, per year.

After 12 months, children in Grade 5 who rinsed weekly with the 0.2 per cent sodium fluoride solution developed 34 per cent fewer DMF teeth and 28 per cent fewer DMF surfaces than did children in the control group. After 20 months, the percentage differences had increased to 51 per cent and 44 per cent, respectively. The differences in mean increments between test and control groups after 20 months were significant at less than the 0.01 level of probability. Percentage differences for children in Grade 1 after 12 months were very similar to those found among fifth graders after the same length of time. However, the benefits for the younger children decreased during the second school year of mouthrinsing; after 20 months, first graders who rinsed with fluoride had 25 per cent fewer new DMF teeth and 16 per cent fewer DMF surfaces than controls. During the course of the investigation, most decay in Grade 1 children occurred on first molars which, because of their high susceptibility to decay, may have experienced a reduced response to treatment. A breakdown of the findings for both first and fifth graders indicated that the protection appeared to be relatively greater on teeth that erupted after the study began than on teeth present in the mouth at the time of the base line examination. In Grade 5, the reduction on newly erupted teeth was 70 per cent compared with only 38 per cent on teeth present on the base line. For the first graders, the respective reductions were 42 and 10 per cent. These findings emphasize the importance of exposing teeth to topically applied fluoride soon after eruption.

We recently reported on a second study in Portland to test the effectiveness of two flavored and sweetened fluoride mouthrinses: an acidulated phosphate-fluoride solution and a neutral sodium fluoride solution (Heifetz, Driscoll and Creighton, 1973). The test mouthrinses, which were commercially prepared, each had a concentration of 0.3 per cent fluoride. Children in Grades 5-7 rinsed their mouths with one of the test agents or a placebo solution once a week in school under the supervision of the classroom teacher. The two-year data indicate that both solutions produced positive results and there was little difference in their levels of effectiveness. Moreover, the more concentrated solutions appeared to give no better results than those obtained in other studies with more dilute solutions. The study was originally designed to last for three years. However, the taste of the mouthrinse solutions, particularly the acidulated phosphate-fluoride, became quite unpopular with the students, and the study had to be curtailed after the second year.

Recommendations

It is recommended that, in geographic areas with low fluoride levels, school-based fluoride-mouthrinsing programmes be initiated using dilute, unflavored solutions of neutral fluoride. Two options are available as to the concentration of fluoride to use for the programme depending on whether daily mouthrinsing or once-weekly mouthrinsing is desired for the programme. For daily mouthrinsing, a 0.05 per cent solution of sodium fluoride is recommended; for rinsing once per week, a 0.2 per cent solution of sodium fluoride should be used. The basis for these recommendations is the results of controlled clinical studies in which these concentrations have been used successfully.

A list of supplies needed for a mouthrinsing programme is appended to this report. The supplies are identical for weekly and daily fluoride-mouthrinsing programmes, with the exception that for weekly rinsing a packet which contains two grams of sodium fluoride is added to one liter of water (to make a 0.2 per cent NaF solution), whereas, for daily rinsing, each packet of sodium fluoride added to one liter of water contains 0.5 grams of sodium fluoride (for a 0.05 per cent solution).

Procedure for Administering a once-weekly Mouthwash

The 0.2 per cent sodium fluoride solution should be prepared just before each mouthrinsing by the classroom teacher or aide. A measured packet of sodium fluoride is opened, and the contents are poured into the polyethylene bottle which contains one liter of tap water. The jug is capped and the contents are thoroughly mixed until all the powder dissolves in the liquid. The plastic, spring-loaded pump is then attached to the neck of the jug.

One designated day each week, elementary school teachers dispense to participating children a paper cup containing 10 milliliters of the fluoride mouthwash solution and an absorbent paper napkin. Under supervision of the classroom teacher, the children carry out the following procedure:

Starting simultaneously, they 'swish' the solution around in their mouths for 60 seconds with their lips tightly closed and their teeth in contact. A watch with a sweep-second hand should be available to time the rinsing. When 'swishing', the solution should be slowly strained back and forth through the spaces between the teeth.

After 60 seconds of rinsing, the contents of the mouth are emptied into the paper cup. Before each rinsing the children should be reminded that at no time during the procedure is the solution to be swallowed.

The absorbent napkin is then stuffed into the cup to soak up the expectorated solution, and the liquid-free cup containing the saturated napkin is disposed of in the large plastic garbage bag.

The children should be instructed not to eat or drink for a period of 30 minutes following the rinse.

As already indicated, the procedure is easy for school children of all ages to master. The supervisory and solution-preparing responsibilities of the teacher or school-aide are easily taught; only minimal in-service training is required.

The entire procedure can be completed in five minutes or less. Inasmuch as the rinse has no objectionable taste, children accept the programme and cooperate well.

The procedure for administering daily mouthrinsings with sodium fluoride is identical to that used for weekly rinsings with the exception that the measured packet of sodium fluoride added to the liter of water is smaller (0.5 g.).

Additional studies should be conducted to determine the value of mouthrinsing with sodium fluoride among children living in optimally fluoridated communities, and to determine the additive effects of combining the procedure with other preventive measures.

APPENDIX

Supplies for a Once-Weekly Mouthrinsing Program

1. 32 oz. (1.05 liter) polyethylene bottles.
2. Plastic caps to fit the bottles in item 1.
3. Plastic, spring-loaded pumps calibrated to deliver approximately 10 ml./stroke, fitted to the caps listed in item 2. (A hole must be drilled in the caps so that the pump may be inserted.)
4. Plastic packets, each containing 2 grams of sodium fluoride (NaF) to be mixed with one liter of water to make a 0.2 per cent NaF mouthwash.*
5. 3½ oz (110 ml.) paper cups.
6. Napkins, 3 ply, 13″ x 13½″, ¼ fold.
7. Large polyethylene bags, 8″ x 4″ x 20″ (for trash).

* For a 0.05 per cent NaF mouthwash (for daily rinsing), the plastic packets should contain 0.5 grams of sodium fluoride.

SUMMARY

Mouthrinsing either daily or weekly with dilute solutions of neutral sodium fluoride has proven to be an effective, inexpensive and feasible method for the prevention of dental caries in non-fluoridated areas. The procedure has special appeal for localities with limited professional personnel in that the technic is easy to learn and may be supervised by non-professional personnel.

PRÉVENTION DE LA CARIE DENTAIRE AU MOYEN DE RINÇAGES AVEC DES SOLUTIONS DE FLUORURE DE SODIUM NEUTRE

RÉSUMÉ

Les rinçages de bouche quotidiens ou hebdomadaires avec des solutions diluées de fluorure de sodium neutre se sont révélés méthode efficace, peu coûteuse et réalisable pour la prévention de la carie dentaire dans les régions dépourvues de fluorure.

Ce procédé est particulièrement indiqué pour les localités disposant d'un personnel professionnel limité car cette technique est facile à apprendre et peut être supervisée par du personnel non professionnel.

KARIESPROPHYLAXE DURCH LOKALE ANWENDUNG VON FLUORIDEN, VOR ALLEM MUNDSPÜLEN MIT NEUTRALEN NATRIUMFLUORIDLÖSUNGEN

ZUSAMMENFASSUNG

Das tägliche oder wöchentliche Mundspülen mit verdünnten Lösungen von neutralem Natriumfluorid hat sich als eine wirkungsvolle, preiswerte und praktische Methode zur Kariesprophylaxe in Gebieten ohne Trinkwasserfluoridierung erwiesen.

Das Verfahren ist besonders geeignet für Gebiete mit beschränkter zahnärztlicher Betreuung, da die Technik leicht zu erlernen ist und von nichtzahnärztlichem Personal überwacht werden kann.

LA PREVENCIÓN DE LA CARIES DENTAL POR MEDIO DEL USO DE FLUORUROS TÓPICOS, PARTICULARMENTE ENJUAGATORIOS BUCALES DE FLUORURO

RESUMEN

Los enguages bucales diarios ó semanales con soluciones diluidas de fluoruro sódico neutro parecen ser efectivos en la prevención de la caries dental en áreas en las que no se ha practicado fluoración. El procedimiento tiene especial aplicación en localidades con un personal profesional limitado, en que la técnica es fácil de aprender y puede ser supervisada por un personal que no sea profesional.

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ANNOUNCEMENT

Self-applied fluoride tablet and fluoride mouthrinsing programs conducted in schools as a means for preventing tooth decay are described in a new publication issued by the National Institute of Dental Research.

Dental caries (tooth decay) is one of the most common diseases of our society. Statistics show that nearly 50 percent of all children under age 15 have never had dental care. The dimensions of the problem of tooth decay and the consequences of this destructive disease make prevention of decay in children's teeth imperative.

Years of research have proved that drinking fluoridated water from birth is the best way to ensure having better teeth for life. Where the fluoride concentration in the drinking water is inadequate, school-based fluoride programs are a practical means of reaching children and achieving a sizable reduction in dental decay.

The new publication, Preventing Tooth Decay: A Guide to Implementing Self-Applied Fluoride Programs in Schools, was developed to assist citizens in initiating these prevention methods in fluoride-deficient school districts or communities. The procedures can be administered with minimal interruption of a school's academic program. Few materials and supplies are required, and the technics of these inexpensive procedures are easy to learn.

(more)

The Use of Dietary Fluoride Supplements for the Prevention of Dental Caries

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I. Introduction

The purpose of this paper is to review the current status of the use of fluoride tablets for the prevention of dental caries. An attempt has been made to identify those areas that appear to need further research to establish efficacy definitively or to develop the procedure to its maximum potential. Salient data of selected clinical studies have been summarized in one or more of four tables contained in the back of the position paper that has been distributed to the attendees of this workshop. The paper will also consider several specific subjects including dosage, mode of action, retained benefits and the practical aspects of administering a fluoride tablet program.

II. Effect of Fluoride Tablets on Deciduous Teeth

Table 1 contains data from eighteen studies that have investigated the cariostatic effects of fluoride tablets on deciduous teeth. Dosage generally ranged from 0.25 mg. to 1 0 mg. of fluoride per day depending upon the ages of the subjects. The average initial ages of the participants was about four years or less in all studies. In the majority of studies, fluorides were administered for periods from two to six years.

Caries reductions, expressed as percentages, are shown in the final column of the table. There appears to be little doubt that fluoride tablets are effective in reducing dental caries in deciduous teeth. Positive findings were reported in all but three[52,65,83] of the eighteen studies. Percentage reductions in the studies reporting benefits ranged widely from 13 percent in Schutzmannsky's study[82] in a group of children receiving fluoride only prenatally to 93 percent in the study by Hoskova[49] for children who received fluoride prenatally as well as four years postnatally.

The eighteen studies have been arranged according to the initial ages of the study participants. It is evident that the benefits generally were greater in those studies in which the initial ages of the children averaged near two years or younger. Also, results from these studies were consistently positive. In contrast, each of the three studies that reported no benefits,[52,65,83] used children aged three years or older at the commencement of tablet administration. In summary, the data indicate that

caries reductions in the approximate range of 50-80 percent may be achieved in deciduous teeth when fluoride administration is begun before about two years of age and is continued for a minimum of three to four years.

III. Effect of Fluoride Tablets on Permanent Teeth

Data from twenty-eight studies that have investigated the cariostatic effects of fluoride tablets on permanent teeth are presented in Table 2.

Dosage generally ranged from 0.25 mg. to 1.0 mg. of fluoride per day, depending upon the ages of the study participants. In 13 of the studies (indicated by asterisks) it was stated that the supplements were given only on school days. In the majority of studies, fluoride administration did not commence until the children were at least five years of age. In most instances the average period of administration was within a range of 2-4 years.

Collectively, the data lead to the conclusion that fluoride tablet administration reduces dental caries in the permanent dentition. The findings, however, were not invariably positive in all the studies; in seven investigations, either no reductions or marginal reductions were reported.[12,24,50,52,60,82,84]

Among those studies showing benefits, percentage reductions in about three-quarters of the instances fall within the approximate range of 20 to 40 percent. The results of studies on permanent teeth also were looked at according to the initial ages of the study participants. There is an indication that children who began fluoride ingestion at younger ages derived greater benefits than children who were older at the start of the study. However, the relationship is not as well defined as it was with deciduous teeth. In summary, the majority of studies have reported caries reductions in permanent teeth of approximately 20 to 40 percent among children initially between 5 and 9 years of age who had consumed fluoride tablets for periods of two to four years.

IV. Effect of Prenatal Use of Fluoride Tablets

Clinical data on the caries-preventive effects of fluoride tablets used prenatally are limited. A review of the literature revealed four pertinent studies, which are summarized in Table 3. Hoskova[49] reported a

caries reduction of 93 percent in the deciduous teeth of a group of children who had received fluoride tablets daily beginning at four months *in utero* and continuing for four years after birth, compared with a 54 percent reduction in another group of children who received tablets for four years beginning shortly after birth. Kailis et al.[51] found an 82 percent reduction in def teeth among Australian children who consumed fluoride supplements prenatally and for 4-6 years postnatally compared with a 56 percent reduction for children who received the supplements only postnatally. The difference between these two reductions was statistically significant. In another Australian study, Prichard[77] reported reductions in def teeth of 70 percent and 40 percent, respectively, following prenatal plus postnatal use and postnatal use only of fluoride supplements. The most recent study on the subject, conducted in 1971 by Schutzmannsky,[82] is particularly interesting for two reasons: it included a group that received only prenatal fluoride supplements and evaluations were made of six-year molars. Because of the age of the children when examined (9 years old) the evaluation of deciduous teeth was limited to cuspids and molars. A small but statistically significant reduction in dmft of 13 percent was found in the group that received fluoride only prenatally. An almost identical (14 percent) reduction was found among children who consumed supplements for nine years, beginning at birth. The highest percentage reduction for deciduous teeth (30 percent) occurred in the group receiving both prenatal and postnatal exposure. With regard to permanent teeth, no benefit was found for the six-year molars of children who received only prenatal exposure. In contrast, however, statistically significant reductions in caries in these teeth of 43 percent and 39 percent, respectively, following prenatal plus postnatal use and postnatal use only, were detected. The similarity of benefits in these two groups plus the lack of benefit in the group receiving only prenatal fluoride suggest that prenatal fluorides are of no value in preventing caries in permanent teeth.

In summary, the clinical studies with fluoride tablets tend to support the efficacy of prenatal fluoride ingestion for deciduous teeth. However, the studies with tablets are few in number and, in some instances, the significance of the apparent additional benefit from prenatal exposure is not clear. Collectively, the data presented indicate that more proof

of efficacy is needed before dietary supplements of fluoride can be recommended for gravid women as a sound public health measure. The data further suggest that if any benefits do result from the procedure, they would accrue only to deciduous teeth. There appears to be no reason from the standpoint of safety of the mother or the developing fetus to contraindicate further research on prenatal fluorides.[32]

V. Effect of Fluoride-Vitamin Combinations

Nine clinical studies in which fluoride-vitamin combinations have been used are presented in Table 4. Sodium fluoride was used in all these studies. The vitamin component varied from study to study and encompassed vitamins A, B complex, C, D and E. Dosages varied from 0.25 to 1 mg. of fluoride per day depending, in most instances, upon the ages of the children. In the study reported in 1971 by Hennon, Stookey and Muhler,[45] the dosage of 0.5 mg. of fluoride derived from the supplement was in addition to that derived from consuming 0.6-0.8 ppm fluoride from the community drinking water supply. These water fluoride levels were considered by the investigators to be sub-optimal for the geographic area. In most of the studies the average initial ages of the children ranged from birth to two years. The period of fluoride ingestion ranged among the studies from two to six years, the notable exception being the study conducted by Aasenden and Peebles[2] in which supplements were ingested for an average of almost ten years.

The nine studies were unanimous in reporting caries-preventive benefits from the ingestion of fluoride-vitamin supplements. Benefits were particularly impressive in those studies[2,39,44,45,46,66] in which the average starting age of the children was approxiamtely two years or younger. In these studies reductions in caries for deciduous teeth ranged from about 50 percent to 80 percent. Findings on permanent teeth were reported in only three studies. Pollak[76] and Minoguchi and his co-workers[68] found similar reductions of 38 percent and 36 percent, respectively, in DMFT with widely differing study conditions. Considerably larger reductions of about 80 percent in DFS were reported in the long-term study by Aasenden and Peebles.[2]

In summary, there appears to be little question that fluoride-vitamin supplements are effective in reducing dental caries, and that the degree

of effectiveness is comparable to that achieved by regular use of fluoride supplements without vitamins. The determining factor in choosing a fluoride-vitamin combination should be whether there is a clear indication that a vitamin supplement is needed. If this need does not exist, then a fluoride supplement without vitamins should be provided. In those cases where vitamins as well as fluorides are indicated, it would be advantageous, for reasons of convenience, to prescribe a combined fluoride-vitamin supplement.

VI. Comments on Specific Aspects of Fluoride Tablet Administration

A. Mode of Action

Fluoride supplements are frequently thought of as being essentially systemic therapeutic agents that provide benefits only until the time of eruption of the teeth. This belief is unfortunate because there is considerable evidence to demonstrate that teeth already erupted when fluoride supplementation begins derive topical benefits from the procedure. For example, several studies presented in Table 1 reported moderate to substantial benefits in deciduous teeth of children who were about two years of age or older when the procedure was initiated.[42,43,46,56,63,76,91] Sufficient data also are available to demonstrate a topical effect on permanent teeth.

It is difficult to quantify systemic benefits from use of fluoride tablets because, in most studies, the teeth that received systemic exposure also received varying periods of post-eruptive exposure. Furthermore, the few studies in which systemic benefits can be separated from topical benefits do not permit one to estimate the total potential of systemic exposure, because in no instance was fluoride ingested from the earliest stages of calcification of the teeth. However, from collective data one can conclude that systemically derived benefits are afforded by the use of fluoride tablets.

In summary, the collective data from clinical studies of fluoride supplementation suggest that both pre-eruptive and post-eruptive exposure are important in imparting cariostatic benefits to the teeth. In order to take advantage of the potential for post-eruptive topical benefits, it is important to instruct children to dissolve or chew the supplement in the mouth before swallowing.

B. Age at Initiation

Considering the preceding discussion, fluoride administration ideally should begin at an age young enough to assure that the teeth will be exposed to fluoride before eruption. One question often raised, however, is when during pre-eruption should fluoride administration begin for maximal benefits to be obtained. Findings on this subject from studies of water fluoridation have been inconsistent. It also appears that the issue has not been resolved definitively for dietary fluoride supplements. From a practical standpoint, however, the lack of definitive information may not be of great concern if the objective is to impart maximal benefits to deciduous as well as permanent teeth. Because the deciduous incisors begin erupting at 6-7 months of age and essentially all of the deciduous teeth are erupted before two years of age,[58] there is little flexibility in starting time for providing fluoride systemically to these teeth.

However, if program limitations require that efforts be directed primarily toward protecting the permanent teeth from caries, then the determination of the optimal period of pre-eruptive exposure may be more important. Unfortunately, there are only limited data on which to determine the best age to begin fluoride supplementation for maximal protection to permanent teeth.

One of the most important conclusions that can be made from the clinical data in regard to age at initiation is that definite caries reductions can be attained when fluoride supplementation is commenced at school-age and is given only on days of school attendance (about 150-200 days per year). Table 2 contains results of nine studies (indicated by asterisks) in which children received fluoride supplements only on school days. Overall percentage reductions for permanent teeth in most of these studies range between about 20 and 35 percent after two or more years of fluoride ingestion. Several investigators reported that the caries reductions experienced by teeth erupting after fluoride administration was initiated were larger than those for teeth present at the beginning of the study. In addition to providing caries-preventive benefits to permanent teeth, the administration of fluoride supplements in school may also confer post-eruptive benefits to deciduous teeth.

In summary, the data suggest that fluoride exposure should begin shortly after birth in order to provide maximal benefits to deciduous and permanent teeth combined. Additional studies are needed to determine the appropriate starting age for conferring optimal systemic benefits solely to the permanent teeth. Important reductions in caries can be achieved by commencing fluoride administration at school-age and by giving the supplements only on days of school attendance.

C. Discontinuation of Fluoride Supplementation

The Council on Dental Therapeutics of the American Dental Association[3] has recommended that administration of fluoride supplements should be continued until about 12 to 14 years of age. A similar recommendation has been made by Nikiforuk and Fraser[72] in their review on the use of fluoride supplements.

Only limited data are available with regard to benefits retained after discontinuation of dietary fluoride administration. The results of a few of the studies reviewed suggest that the benefits derived from fluoride tablets gradually decrease after treatment is stopped. However, it is clear that additional, more definitive information is needed. Until more definitive information is available, it appears that fluoride treatment should not cease at 12 to 14 years of age. Because of their proven topical effect, fluoride supplements in tablet or liquid form could continue to be used. However, if a daily procedure is not feasible at this age, it may be possible to sustain the benefits derived from fluoride supplements by less frequent exposure to more concentrated fluoride agents.

D. Dosage for Fluoride Supplementation

The Council on Dental Therapeutics of the American Dental Association[3] has recommended the following dosage schedule to be followed in an area where there is essentially no natural fluoride in the drinking water: (1) Up to two years of age--add one fluoride tablet containing 1 mg. of fluoride to each quart of water used for drinking and preparing food; (2) two to three years of age--one mg. of fluoride every other day or 0.5 mg. every day; (3) after three years of age--one mg. of fluoride daily. This dosage schedule has been developed essentially from estimates of the amount of fluoride ingested from drinking water that is optimally fluoridated at 1 ppm. Dosage recommendations derived in this manner must be considered

as being tentative inasmuch as both animal and human studies have shown that the metabolic response to fluoride supplements taken once a day does not duplicate that produced by drinking fluoridated water.[41] Whether the difference in the metabolic patterns produced by the two fluoride vehicles has an effect on the magnitude of caries-preventive benefits is unknown. It is also not known if the difference in metabolic patterns is of any importance with respect to the occurrence of dental fluorosis.

A perusal of the clinical studies of dietary fluoride supplements indicates that several different dosage regimens have been used. It is difficult, because of the many variables among the studies, to reach any definitive conclusions with regard to optimal dosage. Among the studies, there are only five in which fluoride administration began at or soon after birth and continued until permanent teeth could be evaluated for caries. Only three of these studies included findings on dental fluorosis. In the studies by Arnold and his co-workers[5] and by Hamberg,[39] it was reported that the children showed no signs of dental fluorosis. The most striking cariostatic benefit, about an 80 percent reduction, was reported by Aasenden and Peebles[2] who used a daily dosage of 0.5 mg. of fluoride for children under three years of age and 1.0 mg. thereafter. The benefit received by these children was greater than that derived by a comparable group of children who consumed fluoridated water. However, these investigators reported an unprecedented high prevalence of fluorosis among the children who consumed the supplement. The fluorosis was limited in all but a few children to the milder types. However, the investigators concluded that the dosages of fluoride given during the first years of life were at the borderline of the tolerable limit. Except for the period from birth to two years of age, the dosage schedule used in this study is identical to that recommended by the ADA's Council on Dental Therapeutics.

It may be possible to obtain greater benefits in school-age children by increasing the dosage of fluoride to levels greater than one milligram without causing undue risk of fluorosis. Additional research is needed, however, to elucidate the relationship between stage of calcification and susceptibility to fluorosis. Another important factor in a school program

is that the supplements are ingested intermittently for an equivalent of about one-half of the calendar year. It may, therefore, be especially desirable to increase the dosage under these circumstances.

Data from a limited number of blood and urinary studies suggest that enhanced cariostatic benefits may result from giving fluoride supplements in divided dosages during the day. Several of the clinical studies presented in Tables 1 and 2 used anywhere from two to four tablets to achieve the total daily dosage. However, it is not possible from these studies to draw definitive conclusions about the efficacy of the procedure.

Another mechanism for possibly providing enhanced systemic benefits is through the use of controlled-release fluoride compounds. Laboratory studies have shown that these types of compounds are capable of sustaining elevated blood fluoride levels for long periods of time.[17,85] Thus, they may duplicate more closely the metabolic effects seen with fluoridated water. One drawback with this type of vehicle is that it may not be possible to use it in a manner that can provide post-eruptive (topical) benefits. If this is true, then the system may be self-defeating.

In summary, it is clear that there is a lack of definitive knowledge with respect to what constitutes an optimal dosage for fluoride supplementation. At the present time it appears premature to suggest that the dosage schedule recommended by the ADA's Council on Dental Therapeutics should be altered, although additional long-term evaluations of this regimen are indicated.

A fluoride dosage of one milligram appears to be well tolerated by school-age children and the possibility of increasing this dosage, particularly if the tablets are being given only on days of school attendance, should be considered. The possibility that enhanced benefits may be produced by using controlled-release type vehicles or by giving the supplements in divided dosages should be further researched.

When fluoride supplements are being given, it is important to be aware of and to make appropriate dosage adjustments for naturally-occurring fluoride in the drinking water supply. Because optimal water fluoride levels vary from one geographic area to another, depending on mean maximum daily temperature,[28] it is also advisable to take this variation into account when adjusting for natural fluorides.

E. Practical Aspects of Fluoride Tablet Administration

In organizing a program for the administration of dietary fluoride supplements, the following approaches may be considered: administration on a full-time basis at home, administration in school on days of school attendance or a combination of home and school administration.

With regard to full-time administration at home, the degree of success depends upon the cooperation that can be obtained from the parents and the child in following the consistent and continuous regimen required. Strong motivation and a clear realization of the need for careful regulation of the daily intake are essential. These demands tend to severely restrict the effectiveness of home use of fluoride administration as a wide-scale measure for preventing dental caries. There have been several reports indicating that public health programs in which fluoride supplements have been distributed to families have met with little success.[25,70,77-79] Although these reports suggest that full-time home use of fluoride supplements holds little promise of being successful as a wide-scale public health measure, the procedure still should be recommended for selected situations where the necessary motivation can be achieved.

The second approach, that of administering fluoride supplements in school, appears to be a more suitable choice for wide-scale use in public health programs. Because the supplements can be administered and supervised by classroom teachers, control of the regimen is better than that normally expected for a home-use program. The procedure of distributing tablets in school, however, is still not an ideal public health measure. The regimen requires the continued enthusiasm and cooperation of school officials, teachers and students. The cooperation of students becomes increasingly important as they advance in age and begin to exert their independence. Thus, it may not be possible to continue fluoride tablet administration in school beyond age 12 to 14.

The third approach involves a combination of the two approaches previously discussed. The combination could be derived by giving tablets at home until school age and then giving them only in school, or by giving tablets in school on school days and at home on weekends and during vacations. However, the advantages of this approach are questionable. If administration can be carried out conscientiously at home from birth until five years of age, it probably could be continued successfully at home

for several more years. The other combination in which fluoride supplements would be provided for home use on non-school days does not seem to be practical. The intermittent use of supplements at home is likely to be subject to more neglect and abuse than is full-time use at home. Furthermore, it is not clear from the available data that greater benefits are derived by giving the supplements to children of school age on a full-time basis rather than only on school days.

Related to the practicality of fluoride tablet programs is the procedure of giving fluoride supplements in divided dosages. In the study by Driscoll and his co-workers,[42] in which one study group receives one fluoride tablet in the morning and another tablet in the afternoon, it has been found that many teachers have not remembered to give the tablet in the afternoon, or have given it intermittently because of their reluctance to interrupt their schedules a second time during the day. The same problem undoubtedly would occur if fluoride tablets were being given in divided dosages at home.

With regard to the cost of administering a fluoride tablet program, estimates received from the manufacturer indicate that Phos-Flur (APF) tablets would cost $18.00 per 1000 tablets and Luride (neutral NaF) tablets would cost $8.00 per 1000 for large quantities used in public health programs.[37] Using these figures, the annual cost per child for the sodium fluoride tablets would be $2.92 for full-time administration and $1.44 for administration on school days (180 days). The corresponding figures for the APF tablets are $6.57 and $3.24.

In summary, the most practical approach to fluoride tablet administration in public health programs appears to be that of administering the supplements in school on days of school attendance. To derive maximum benefit from the procedure, administration should begin in the earliest grades. Because of its outstanding caries-preventive potential, full-time use of fluoride supplements at home should be encouraged in selected situations where the necessary motivation can be achieved. The difficulty of giving fluoride supplements in divided dosages at separate times during the day tends to restrict the feasibility of that procedure. It appears

that the cost per child for administering fluoride tablet programs is not unreasonable. However, analyses must be carried out to establish the cost-benefit ratios for dietary fluoride administration and these ratios must be compared with those of other caries-preventive procedures. The various shortcomings associated with fluoride tablet administration clearly indicate that the procedure is not a feasible substitute in communities where water fluoridation can be implemented.

Table 1

Caries-Preventive Effects of Fluoride Tablets on Deciduous Teeth: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects In Years	No. of Subjects	Years of F Intake	Caries Reduction	
Arnold et al. 1960	NaF	0.5-1	Birth-6	121	1-12	"Comparable to water F" (deft)	[3]
Pollak 1960	NaF+V†	1	3	100	2	80% (dmft)	[3]
	NaF+V	1	4	111	2	20% (dmft)	[3]
Ziemnowicz-Glowaka 1960	NaF	0.8* (4x0.2)ϕ	3	139	2	26% (dmfs)	[1]
Lutomska & Koninska 1962	NaF	0.6 (3x0.2)	3-4	154	2	"No significant effect"	[3]
Kamocka et al. 1964	NaF	0.75* (3x0.25)	3	64	3	0% (dmft)	[2]
	NaF	0.75* (3x0.25)	4	79	3	0% (dmft)	[2]
Leonhardt 1965	NaF+V (liquid)	1*	3	?	2	38% (dmft)	[3]
	NaF+V (liquid)	1*	4	?	2	30% (dmft)	[3]
Hennon et al. 1966, 1967, 1970	NaF+V	0.5-1	Birth-5½	85	3	63% (dmfs)	[1]
	NaF+V	0.5-1	Birth-5½	54	[illegible]	68% (dmfs)	[1]
	NaF+V	0.5-1	Birth-5½	60	[illegible]	66% (dmfs)	[1]
Margolis et al. 1967	NaF+V	0.5-1	Birth	91	5	70% (deft)	[3]
Hoskova 1968	NaF	0.25-1 (1-4x0.25)	Prenatal	78	4	93% (deft)	[1]
	NaF	0.25-1 (1-4x0.25)	Birth-1	151	4	54% (deft)	[1]
Kailis et al. 1968	NaF	?	Prenatal	50	4-6	82% (deft)	[1]
	NaF	?	Birth	92	4-6	56% (deft)	[1]
Stolte 1968	?	1	3	130	3	11% (dmft)	[3]
Prichard 1969	NaF	?	Prenatal	176	6-8	70% (deft)	[1]
	NaF	?	Birth	282	6-8	40% (deft)	[1]

Table 1 (Continued)

Caries-Preventive Effects of Fluoride Tablets on Deciduous Teeth: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects In Years	No. of Subjects	Years of F Intake	Caries Reduction	
Hamberg 1971	NaF+V (drops)	0.5	Birth	342	3	57% (decayed teeth)	[3]
	NaF+V (drops)	0.5	Birth	342	6	49% (decayed teeth)	[3]
Hennon et al. 1971	NaF+V	0.5	<1	458	3	78% (defs)	[3]
Kraemer 1971	CaF_2	1	4	170	2	22% (dmft)	[3]
	CaF_2	1	5	82	2	18% (dmft)	[3]
Schutzmannsky 1971	NaF	1	Prenatal	100	<1	13% (dmft)	[1]
	NaF	0.25-1 (1-4x0.25)	Prenatal	100	9	30% (dmft)	[1]
	NaF	0.25-1 (1-4x0.25)	Birth	100	9	14% (dmft)	[1]
Hennon et al. 1972	NaF+V	1	1½-3	182	1	57% (defs)	[1]
	NaF	1	1½-3	165	1	55% (defs)	[1]
	NaF+V	1	1½-3	95	2	66% (defs)	[1]
	NaF	1	1½-3	91	2	63% (defs)	[1]
Aasenden & Peebles 1974	NaF+V††	0.5-1	Birth	87	8-11	80% (dfs, 2nd molars)	[1]

† V=Vitamins

†† A NaF+V combination was given up to 3 years of age. Beyond this age some children received NaF+V while others received only NaF.

* Tablets given only on school days.

ϕ Four 0.2 mg. F tablets given daily.

[1] Statistically significant

[2] Not statistically significant

[3] No statistical test reported

Table 2

Caries-Preventive Effects of Fluoride Tablets on Permanent Teeth: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Stones et al. 1949	NaF	1.5	6-14	125	2	0% (caries intensity)	[2]
Bibby et al. 1955	NaF (pill)	1	5-14	133	1	Tentative finding: no reduction (new carious areas)	[3]
	NaF (lozenge)	1	5-14	119	1	Tentative finding: possible reduction (new carious areas)	[3]
Niedenthal 1957	NaF	1* (2x0.5)$^{\phi}$	6-7	251	3	22% (DMFT)	[3]
Wrzodek 1959	NaF	1*	6-9	8381	3	21% (DMFT)	[3]
	NaF	1*	6-9	13585	4	22% (DMFT)	[3]
Arnold et al. 1960	NaF	0.5-1	Birth-6	121	1-15	"Comparable to water F" (DMFT)	[3]
Krusic 1960	CaF_2	?	8-15	480	1-3	70% (?)	[3]
Pollak 1960	NaF+V†	1	6-7	300	2	38% (DMFT)	[3]
Ziemnowics-Glowaka	NaF	0.8* (4x0.2)	3-6	704	2	33% (DMFS)	[1]
	NaF	0.8* (4x0.2)	5-6	204	3	28% (DMFS)	[1]
Jez 1962	CaF_2	?	7-11	7200	2½	0% (?)	[3]
Krychalska-Karwan & Laskowska 1963	NaF	?	grammar school	134	4	5% (DMFS)	[3]
Minoguchi et al. 1963	NaF+V	0.25	Birth-6	75	6	36% (DMFT)	[3]
Binder 1964, 1967	NaF	1*	6	?	4	35% (DMFT)	[3]

Table 2 (Continued)

Caries-Preventive Effects of Fluoride Tablets on Permanent Teeth: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Grissom et al. 1964	NaF	1*	6-11	178	2	34% (DMFS)	[1]
Kamocka et al. 1964	NaF	0.75* (3x0.25)	3	64	3	17% (DMFT)	[2]
	NaF	0.75* (3x0.25)	4	79	3	60% (DMFT)	[1]
Leonhardt 1964	NaF	1	6	398	4	32% (DMFT)	[3]
	NaF	1	7	429	3	25% (DMFT)	[3]
Hippchen 1965	?	1	6	500	3	32% (DMFT)	[3]
Schutzmannsky 1965	NaF	0.75* (3x0.25)	6	580	4	25% (DMFS)	[3]
	NaF	0.75* (3x0.25)	6	197	6	27% (DMFS)	[3]
Berner et al. 1967, 1968	NaF	0.5-1*	5-7	105	3	84% (DMFS, except 1st molar) 33% (DMFS, 1st molar)	[3]
	NaF	1*	7-9	158	4	16% (DMFT)	[3]
	NaF	1*	7-9	160	6	20% (DMFT)	[3]
	NaF	1*	7-9	109	7	24% (DMFT)	[3]
DePaola & Lax 1968	APF	1*	6-8	130	2	23% (DFS)	[1]
Girardi-Vogt 1968	NaF	1	1st grade	?	3	31% (?)	[3]
Stolte 1968	?	1	3	150	3	69% (DMFT)	[3]
Marthaler 1969	NaF	0.5-1* (2-4x0.25)	6-7	450	1-8	36% (DMFT) 47% (DMF sites)	[1]
Hamberg 1971	NaF+V (drops)	0.5	Birth	342	7	70% (decayed teeth)	[3]

Table 2 (Continued)

Caries-Preventive Effects of Fluoride Tablets on Permanent Teeth: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Schutzmannsky 1971	NaF	1	Prenatal	100	1	6% (DMFT)	[2]
	NaF	0.25-1 (1-4x0.25)	Prenatal	100	9	43% (DMFT)	[1]
	NaF	0.25-1 (1-4x0.25)	Birth	100	9	39% (DMFT)	[1]
Aasenden et al. 1972	APF (liquid)	1*	8-11	109	3	30% (DFS)	[1]
	NaF (liquid)	1*	8-11	114	3	27% (DFS)	[1]
Plasschaert & Konig 1973	NaF	1	7	190	2	32% (DMFS)	[1]
Assenden & Peebles 1974	NaF+V††	0.5-1	Birth	100	8-11	80% (DFS, all teeth) 77% (DFS, 1st molars)	[1]
Driscoll et al. 1974	APF	1*	6-7	202	2½	6% (DMFS)	[2]
	APF	2* (2x1)	6-7	197	2½	27% (DMFS)	[1]

† V=Vitamins

†† A NaF+V combination was given up to 3 years of age. Beyond this age some children received NaF+V while others received only NaF.

* Tablets given only on school days

ϕ Two 0.5 mg. F tablets given daily

[1] Statistically significant

[2] Not statistically significant

[3] No statistical test reported

Table 3

Caries-Preventive Effects of Fluoride Tablets Used Prenatally: A Summary

Study	F Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Hoskova 1968	NaF	0.25-1 (1-4x0.25)$^{\phi}$	Prenatal	78	4	93% (deft)	[1]
	NaF	0.25-1 (1-4x0.25)	Birth-1	151	4	54% (deft)	[1]
Kailis et al. 1968	NaF	?	Prenatal	50	4-6	82% (deft)	[1]
	NaF	?	Birth	92	4-6	56% (deft)	[1]
Prichard 1969	NaF	?	Prenatal	176	6-8	70% (deft)	[1]
	NaF	?	Birth	282	6-8	40% (deft)	[1]
Schutzmannsky 1971	NaF	1	Prenatal	100	<1	13% (dmft) 6% (DMFT)	[1] [2]
	NaF	0.25-1 (1-4x0.25)	Prenatal	100	9	30% (dmft) 43% (DMFT)	[1] [1]
	NaF	0.25-1 (1-4x0.25)	Birth	100	9	14% (dmft) 39% (DMFT)	[1] [1]

ϕ One to four 0.25 mg. F tablets given daily
[1] Statistically significant
[2] Not statistically significant

Table 4

Caries-Preventive Effects of Fluoride-Vitamin Combinations: A Summary

Study	F-Vitamin Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Pollak 1960	NaF, Vit. A,D,E	1	3	75	2	80% (dmft)	[3]
	NaF, Vit. A,D,E	1	4	148	2	20% (dmft)	[3]
	NaF, Vit. A,D,E	1	6-7	300	2	38% (DMFT)	[3]
Minoguchi et al. 1963	NaF, Vit. A,D	0.25	Birth-6	75	6	36% (DMFT)	[3]
Leonhardt 1965	NaF, Vit. A,D,E	1*	3	?	2	38% (dmft)	[3]
	NaF, Vit. A,D,E	1*	4	?	2	30% (dmft)	[3]
Hennon et al. 1966, 1967, 1970	NaF, Vit. A,B,C,D	0.5-1	Birth-5½	85	3	63% (dmfs)	[1]
	NaF, Vit. A,B,C,D	0.5-1	Birth-5½	54	4	68% (dmfs)	[1]
	NaF, Vit. A,B,C,D	0.5-1	Birth-5½	60	5	66% (dmfs)	[1]
Margolis et al. 1967	NaF, Vit. A,B,C,D	0.5-1	Birth	91	5	70% (deft)	[3]
Hennon et al. 1971	NaF, Vit. ?	0.5	<1	458	3	78% (defs)	[3]
Hamberg 1971	NaF, Vit. A,D, (drops)	0.5	Birth	342	3	57% (deciduous decayed teeth)	[3]
	NaF, Vit. A,D (drops)	0.5	Birth	342	6	49% (deciduous decayed teeth)	[3]
Hennon et al. 1972	NaF, Vit. A,B,C,D	1	1½-3	182	1	57% (defs)	[1]
	NaF	1	1½-3	165	1	55% (defs)	[1]
	NaF, Vit. A,B,C,D	1	1½-3	95	2	66% (defs)	[1]
	NaF	1	1½-3	91	2	63% (defs)	[1]

Table 4

Caries-Preventive Effects of Fluoride-Vitamin Combinations: A Summary

Study	F-Vitamin Compound	Daily Dosage (mg)	Initial Age of Subjects in Years	No. of Subjects	Years of F Intake	Caries Reduction	
Aasenden & Peebles 1974	NaF, Vit.†† C,D		Birth	87-100	8-11	80% (dfs, 2nd molars)	[1]
						80% (DFS, all teeth)	[1]
						77% (DFS, 1st molars)	

†† A NaF+V combination was given up to 3 years of age. Beyond this age some children received NaF+V while others received only NaF.
* Tablets given only on school days
[1] Statistically significant
[3] No statistical test reported

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